The Role of Dissociation in Encoding and Retrieval of an Analogy Trauma Narrative: Implications for Understanding Posttraumatic Stress Disorder.

A thesis submitted in partial fulfilment of the requirements for

a degree of Masters of Science in Psychology

Tanja C. Clark

Department of Psychology

University of Canterbury

2021

Acknowledgements

I would like to thank everybody who has been there to make this research possible. First and foremost, I would like to thank my supervisor, Professor Martin Dorahy, for his feedback, guidance and mentoring throughout this time. It was such a privilege to work with, and learn from such a supportive and knowledgeable expert in the field of trauma, dissociation, and PTSD. The weekly meetings with his research group were insightful, and it was a pleasure to be part of this fantastic team. I am also very grateful for the support of Michelle Downs-Woolley, and would like to thank her for being very supportive, patient and understanding. She was vital in teaching me the coding systems of the narratives and always available to assist.

I would also like to thank the participants for their time and engagement in this study. I could not have done this without you. A special thank you to Megan Livingstone, who supported me throughout proofreading and exchanging ideas.

Finally, a huge thank you to my family and friends for all the support. Especially my husband, Brent, who has supported me from day one and has been incredibly supportive in so many ways. Also a big thank you to my children who have stepped above and beyond. I am so proud of you all. Thank you all again for being there throughout the journey.

Table of Contents

List of Tables

List of Figures

Abstract

Only a portion of people who experience a traumatic event go on to develop posttraumatic stress disorder (PTSD). One avenue to reduce the significant impact of PTSD is to understand the underlying mechanisms of the development of PTSD. Peritraumatic dissociative experiences around the time of trauma predict the development and maintenance of PTSD. Following a small amount of recent work, the current study aimed to further investigate the impact of peri-experimental dissociation during the encoding and retrieval phases of an analogue traumatic narrative. One hundred and fifty-six university students were designated to one of three visual conditions: watching a spinning dot (dissociation), watching pictures (comparison), or no visual stimuli (control) at three stages of the experiment (baseline, encoding, and recall). At encoding, participants listened to an analogue trauma narrative and were asked to recall the narrative three days later, while concurrently watching visual stimuli (or control) at both phases. Peri-experimental dissociation was successful at baseline as predicted yet failed to produce dissociation at encoding and recall. Spontaneous dissociation was therefore used at encoding and recall as the independent variable. An intrusion diary was used to measure intrusions and revealed an increase in frequency but not distress of intrusions for those with higher dissociation. The word-cue association task and word-stem completion task measuring perceptual and conceptual priming did not reveal any differences between groups. No differences were evident across dissociation groups for narrative details or coherence. The findings suggest that dissociation during encoding may not have an impact on narrative elaboration or structure, at least for analogue trauma with university student participants.

Introduction

The lifetime prevalence of experiencing a traumatic event, such as immediate or indirect threat, is over 50% in the U.S. population (Ozer et al., 2003). Yet, not everybody who experiences trauma develops posttraumatic stress disorder (PTSD). The literature suggests that processing of a traumatic event is a factor in later posttraumatic symptom development. Predominantly perceptual processing and retrieval, and a lack of contextual processing have been implicated in PTSD and its characteristic symptoms such as intrusions (Brewin & Saunders, 2001; Ehlers, 2010; Ehlers & Clark, 2000). Peritraumatic dissociative symptoms are described as predictors in developing and maintaining PTSD (Huntjens et al., 2013; Murray et al., 2002).

This study investigates the effect of a traumatic narrative and peritraumatic dissociation on memory processing. Initially, this introduction defines PTSD and investigates memory processes, such as perceptual and conceptual processing, which are thought to be responsible for developing post-traumatic symptoms. Research on perceptual and conceptual processing and models explaining the underlying mechanisms of posttraumatic stress are explored next. Intrusion and their use in experimental designs are considered before an overview of some methodologies utilised in this study, to investigate narratives regarding posttraumatic stress. The introduction will then lead into dissociation, especially peritraumatic dissociation and the relation to PTSD, before investigating dissociation in experimentally controlled environments. Finally, the analogue trauma film paradigm is reviewed before an outline of the present study and the hypotheses.

Posttraumatic Stress Disorder

Trauma and its repercussions have been studied for many years (Bedard-Gilligan & Zoellner, 2012; Dorahy et al., 2016; Marks et al., 2018; Ozer et al., 2003). Previously, trauma was generally thought of in connection with war experiences. It was not until relatively more recent times that PTSD was associated with a broader range of traumatic events, such as sexual assault, motor vehicle

accidents and domestic violence (Burgess & Holmstrom, 1974). Early descriptions of what is now recognised as PTSD date back over 100 years. For example, after World War I, Mott (1919) described shellshock and suggested it was better explained as emotional shock. One-third of returning soldiers without physical injuries suffered from war neurosis, a precursor to PTSD (Mott, 1919). Similar experiences were later called "combat fatigue" in the International Classification of Diseases (ICD-8; Organization, 1966). Rape trauma syndrome was coined by Burgess and Holmstrom (1974) and was focused on sexual trauma in females, with no connection to other trauma disorders. PTSD, as an all-encompassing diagnostic entity for trauma disorders, was only introduced into the Diagnostic and Statistical Manual of Mental Disorders in 1980 (DSM-III; American Psychiatric Association, 1980).

PTSD Definition

PTSD is described in the DSM-5 as the development of a set of characteristic symptoms following exposure to trauma (American Psychiatric Association, 2013). The trauma has to involve experiencing or witnessing actual or threatened death, serious injury or sexual violence. Trauma can also include indirect exposure to trauma such as experienced by fire fighters or police offices at traumatic scenes. The key symptom clusters of PTSD are intrusive symptoms (such as nightmares, intrusive memories or flashbacks), avoidance symptoms (distancing from internal or external reminders of the experience), cognitive and mood changes (including the inability to remember essential features of the trauma and negative thoughts about oneself), and arousal symptoms (such as hypervigilance; American Psychiatric Association, 2013). A specification clause for a dissociative subtype of PTSD includes depersonalisation and derealisation symptoms. Depersonalisation refers to alterations in the person's perception of themselves (e.g., out of body experiences). Derealisation captures alterations in the person's perception of the world (e.g., seeing the world as dream-like). According to DSM-5 (American Psychiatric Association, 2013), PTSD has a lifetime prevalence (in

the U.S.) of almost 9%, and a 12-months prevalence of 3.5%. Considering that the lifetime prevalence of experiencing a traumatic event is over 50% (Ozer et al., 2003), the majority of people experiencing a trauma do not go on to develop PTSD. This suggests that PTSD is not a necessary progression from trauma (Ozer et al., 2003).

Memory Processing in PTSD

The formation of memories during stressful events is associated with future posttraumatic symptomology (Marks et al., 2018). Studies have been investigating the cognitive processes and interpretations, which may be involved in creating problematic outcomes (Brewin et al., 2010; Ehlers & Clark, 2000). The contribution of autobiographical memory, as well as the perceptual and conceptual processing of trauma events, have been implicated as strong predictors of later PTSD symptoms and development (Ehlers & Clark, 2000).

Autobiographical Memory. Autobiographical memories are a recollection of episodes of an individual's life. Conceptually, these are based on a combination of episodic (personal experiences) and semantic (general knowledge) memories and represent an individual's memory of their own life (Williams et al., 2008). Personal episodic autobiographical memory, therefore, is the recall of events that have been personally experienced by an individual and involve the recall of specific event details, and their location in space and time (Piolino et al., 2003; Tulving, 1985, 2001, 2002). Personal semantic autobiographical memory, on the other hand, is the collection of facts of an individual's life that are retrieved in the absence of specific contextual encoding, such as telephone numbers (Tulving et al., 1988). Autobiographical memory allows an individual to navigate both the practical aspects of their everyday life and, more importantly, it contributes to the formation of a person's identity, self-coherence and self-continuity (Piolino et al., 2002). Autobiographical memories are therefore, a combination of events happening to or around an individual, which are processed through past experiences and general knowledge into one's own explicit, long-term

memory. These details and personal meanings are linked chronologically to specific events in life (Ehlers & Clark, 2000).

Perceptual Processing. Perceptual processing is data-driven and is referred to as bottom-up processing. Bottom-up processing refers to the processing of perceptions that are presented as an external stimulus and then work upwards into a representation, which is recognised and then processed. Perceptual memory is implicit (not conscious) and is not contextually processed (Brewin, 2014). Perceptual processing has been successfully evidenced in tasks, such as the word stem completion task (Golier et al., 2003; Lyttle et al., 2010; Roediger et al., 1992). For this task, the beginning of a word (word-stem) that has had previous exposure is presented to the participant. Participants are then asked to complete the word stem with the first word that comes to mind. The theory is that implicit memories are more easily triggered when prompted with a word stem (Roediger et al., 1992). If the target word is recalled, then perceptual priming has occurred.

Conceptual Processing. Conceptual processing is considered to be a top-down process, meaning that it is profoundly influenced by expectations and prior knowledge. The process, therefore, generally involves interpretation and understanding of previous knowledge and autobiographical memories (Conway & Pleydell-Pearce, 2000). This process is generally more conscious and controlled, and can be measured with tasks such as the word-cue association task (Lyttle et al., 2010; Vaidya et al., 1997). In this task, a word is presented to the participant that has the same semantic meaning as a previously presented word (target). Participants are then asked to choose an alternative or associated word. If a word has been conceptually processed then the recall of the target word would indicate successful conceptual priming and processing (Lyttle et al., 2010).

Perceptual processing includes the processing of external sensory impressions, such as a yellow hat an assailant was wearing, which can become a trigger when seeing any yellow hat or similar item if the memory of the yellow hat has not been properly integrated into conceptual

memory. In contrast, conceptual processing is the memory of a birthday party many years ago, which brings up memories of the people who were attending. This is based on context and contextual comprehension and integration. Inadequately processed stimuli can lead to later posttraumatic symptoms (Buck et al., 2006; Ehlers & Clark, 2000; Evans et al., 2007).

Research on Perceptual and Conceptual Processing. Although in its relative infancy, an evidence base for perceptual and conceptual processing is rapidly expanding. For example, Buck et al. (2006) found that perceptual memory, which was coded into narratives after trauma, was predictive of PTSD four months after the incident. Furthermore, a meta-analysis by Crespo and Fernández-Lansac (2016) revealed that of the 22 studies they reviewed since 2004, overall trauma memories are generally more perceptual and sensory-driven and contain more emotional facts.

Lyttle et al. (2010) investigated the effect of state dissociation on perceptual and conceptual priming in a clinical population who reported trauma from the conflict in Northern Ireland. Twenty-five participants had a PTSD diagnosis, and the other 25 participants did not. Participants completed the word-stem completion task for perceptual priming and the word-cue association task for conceptual priming. Each priming task consisted of trauma-related, general threat and neutral words as targets. Lyttle et al. (2010) found increased perceptual priming and decreased conceptual priming in the PTSD group compared with the non-PTSD group. Additionally, an implicit memory bias was reported in the PTSD group and highlighted the significance of memory processes in PTSD. State dissociation was implicated as a strong contributor to perceptual priming. The evidence overall indicates that data-driven processing affects memory and can lead to more PTSD symptoms in the future. Potentially, therefore, high levels of perceptual processing in combination with less conceptual processing during a traumatic event could increase the risk for PTSD development.

Cognitive Models of PTSD

Cognitive models describe how perceptions, thoughts and processing of an experience influence emotional, and behavioural reactions. Two cognitive models, explaining the theories of how perceptual and conceptual processing is affected in PTSD are very prominent in the literature, the cognitive model of PTSD (Ehlers & Clark, 2000) and the dual representation theory (Brewin et al., 1996; Brewin et al., 2010).

The Cognitive Model. Ehlers and Clark (2000) describe PTSD symptoms as a paradox. On the one hand, PTSD often presents with a limited ability to recall events from a trauma intentionally, and if there is recall, it is often disorganised and fragmented. On the other hand, PTSD is known for involuntarily triggering memories, which are often emotionally laden and vivid (Ehlers & Clark, 2000). The model proposes that the appraisal of the trauma and memory processing for the event at the time the event takes place can cause persistent PTSD symptoms. Ehlers and Clark (2000) suggest that PTSD symptoms derive from experiences being processed with too much perceptual and not enough conceptual details. Perceptual, data-driven processing focuses on the incoming stimuli, with regard to their sensory elements. Strong perceptual associations result in unintentional, stimuli driven responses. If that stimulus is not conceptually processed into context, the memory will be more disorganised (Ehlers & Clark, 2000; Lyttle et al., 2010). In contrast conceptual processing offers a higher elaboration of autobiographical meaning and focuses on contextualisation rather than single perpetual elements of the experience. Conceptual processing has the opposite effect to perceptual processing as it allows for the organisation of meaning and integration of the experience with the autobiographical knowledge base. As such, increased perceptual processing of a traumatic event compared to conceptual processing is more likely to result in PTSD symptoms (Dorahy et al., 2016; Ehlers, 2010; Ehlers & Clark, 2000).

Dual-Representation Theory. The dual-representation theory has some overlap with the cognitive model. Brewin and colleagues (1996) suggest that two different memory systems exist when encountering trauma: Verbally Accessible Memory (VAM) and Situationally Accessible Memory (SAM). The VAM is an autobiographical memory system that encodes and allows for the deliberate retrieval of complex and conceptual parts of the traumatic experience (e.g., narrative meaning). The SAM, however, is more focused on perceptual stimuli of traumatic events and consists of shallower memory processing. During a traumatic event, the SAM is more active, inhibiting the VAM, and hinders the processing of conceptual representations of the event, leading to involuntary flashbacks or intrusions and may inhibit intentional recall of conceptual details (Brewin et al., 1996). Brewin et al. (2010) propose that in PTSD, the SAM stores extremely stressful situations without associating them to the VAM. Therefore, involuntary memories arise without any connection to autobiographical context. As memory is not encoded properly, there can be increased peritraumatic reactions, especially in combination with dissociation. Brewin et al. (2010) propose that memory, which is considered critical for future survival, is stored as sensory information. For example, intrusions may therefore be information stored for later in-depth processing, once the immediate threat or danger has passed. According to this model, PTSD symptoms are, therefore, failures to encode information from the sensory experience into autobiographical memory.

Both theories agree that conceptual processing provides elaboration of a trauma's context and meaning (Ehlers & Clark, 2000), autobiographical memories and verbal narrative representation (Brewin et al., 1996; Brewin et al., 2010). Furthermore, perceptual processing provides more sensory representations and perceptual characteristics. Higher perceptual and lower conceptual information processing during the encoding of memory of a traumatic event increases the risk for PTSD development (Brewin et al., 1996; Brewin et al., 2010; Ehlers & Clark, 2000).

Intrusions

Intrusions are the distressing, invasive re-experiencing of traumatic events and are common in the initial weeks of PTSD. Generally, intrusions become less distressing and frequent in time, and understanding the effect of intrusions in PTSD development is potentially vital in the development of effective treatments (Ehlers, 2010). Although intrusions immediately following a traumatic event are common (Dorahy et al., 2016; Ehlers, 2010; Sündermann et al., 2013), PTSD is not a foregone conclusion. Rather, persistent intrusions are a diagnostic tool for PTSD (DSM-5; American Psychiatric Association, 2013). Evidence currently paints a mixed picture of the underlying mechanisms in PTSD development. For example, Ehlers (2010) describes three factors in relation to intrusions that might underlie the development of PTSD: memory processes causing easy triggering; the way memories are interpreted; and cognitive and behavioural responses. Alternately, Sündermann et al. (2013) looked at perceptual processing as a contributor to intrusive memories. In their study, distressing intrusions were reported at two weeks post-exposure to trauma picture stories, yet not at three months.

Marks et al. (2018) conducted a meta-analysis of intrusive memories and distress. Out of 106 experimental and prospective studies, 92 were from non-clinical samples. The analysis was focused on intrusions in combination with clinical diagnoses, such as PTSD, depression, and anxiety. When investigating peritraumatic studies, Marks et al. (2018) found emerging evidence that data-driven processing at encoding is a factor of later intrusions. Additionally, pre-event and post-event negative appraisal, pre-existing psychopathology, and increased data-driven processing were indicated as predicting intrusions. Increased post-event conceptual processing was also connected with fewer intrusions. These results, however, are broad and inconclusive regarding factors that cause intrusive memories and do not fully explain why only some individuals have persistent intrusive memories (Marks et al., 2018).

Intrusion diaries are frequently used to measure and compare intrusions (Brewin & Saunders, 2001; Emily A. Holmes & Corin Bourne, 2008; James et al., 2016). These diaries are generally in paper form and give instructions to note down intrusions occurring after exposure to a traumatic narrative or film and a rating for the level of distress of the intrusion. These are usually collected within a few days or weeks, often in combination with a recall task, such as the word-stem completion task used in the current study. These diaries are then scored to provide an estimate of the effect of the traumatic narrative or film. Intrusion diaries have been found to provide a reliable assessment of intrusions experienced by participants following exposure to a traumatic event. Although they are reliant on self-report, they are an accepted measure of intrusions.

Narrative Measures in PTSD

Narratives are a commonly used in research into trauma memories. The recall of these narratives can reveal discrepancies between the narrative presented to the participant and their recall of the event. These are vital in understanding and treating posttraumatic stress. Narrative recall combined with posttraumatic stress is frequently examined in studies (Filkukova et al., 2016; Foa et al., 1995; Halligan et al., 2002). For example, Foa et al. (1995) created a coding system used to study rape victims. The coding system analyses changes in the organisation, processing and structure of the narratives being recalled. Using this coding system, the authors found that there was increased fragmentation in the narrative and an absence of emotional processing. Halligan et al. (2003) adapted this coding system to include algorithms for memory disorganisation, and global coherence (as a measure of the overall coherence of a narrative). The adapted version has shown that PTSD narratives are longer (Jelinek et al., 2009; Römisch et al., 2014), and more disorganised (Halligan et al., 2003; Jelinek et al., 2009), and are more likely to be written in the present tense (Crespo & Fernández-Lansac, 2016).

Currently, investigations are focused on the fragmentation, disorganisation and coherence of a narrative recall, yet these terms are often used interchangeably (Crespo & Fernández-Lansac, 2016). Problematically, this means that cross-study comparisons are hindered by inconsistent definitions in the research. When referring to memory fragmentation, this could refer to the fragmentation around individual phrases, a combination of incoherent phrases, or the overall coherence of a narrative. This causes apparent inconsistencies in the findings that are perhaps the result of limited operational definitions, thus providing an inconsistent picture. When separating the use of these words, fragmentation can be perceived as the disorganisation of content, such as repetitions or speech fillers (Bedard-Gilligan et al., 2017; Huntjens et al., 2013), whereas disorganisation is understood as incoherence on an utterance level (speech utterance, containing one action or thought; Foa et al., 1995; Harvey & Bryant, 1999). On the other hand, coherence can be used to measure holistic understanding and comprehension of the entire narrative or event (Halligan et al., 2002) rather than a narrative detail. These definitions will be used in the current research as described.

Narrative Detail

Narrative details are the framework of a narrative (Foa et al., 1995). Details consist of utterances, such as thoughts, repetitions and actions, which can support measures for fragmentation, disorganisation and elaboration. Research suggests that alterations in narrative details are indicative of higher PTSD symptomology and dissociation. The coding system created by Foa et al. (1995) to investigate changes in narratives from rape victims for PTSD treatment has frequently been used in research to investigate changes to the narrative in experimental research (Buck et al., 2006; Crespo & Fernández-Lansac, 2016; Halligan et al., 2003). She used narrative utterances to score fragmentation, (repetitions, unfinished thoughts, and speech fillers), thought utterances (desperate, confusing, disjointed, and disorganised thoughts), organised thoughts (realisation, decision making,

or planning), negative feelings (emotional responses), sensation (a reference to the five senses), action (either self or other) and dialogue (verbalisation) to describe narrative details. Foa et al. (1995) used these coding details to compare pre- and post-treatment of exposure therapy for 14 female victims of sexual assault. The inter-rater reliability for coding (.94) was high. The results showed an increase in action and dialogue details, as well as thoughts and feelings post-treatment. Fragmentation revealed no change. Less fragmentation was, however, indicative of fewer trauma symptoms overall.

More recently, Filkukova et al. (2016) used this coding system when assessing 30 adolescents who survived the Utøya Island shooting in Norway in 2011. In an interview conducted 4-5 months after the incident, they found that survivors with high posttraumatic stress symptoms reported more dialogue and less organised thoughts than those with low symptoms. There were also more external events (actions, dialogue) reported by the high symptom group and fewer internal events (feelings, thoughts). Filkukova et al. (2016) found no differences in fragmentation or length of narratives. The study reveals similar results to Foa et al. (1995), again with a high inter-rater reliability (overall 98.3%) supporting the clear division of the utterances measured.

Buck et al. (2006) introduced an experimenter-rated code for perceptual and conceptual utterances. Utterances were each scored according to their conceptual or perceptual memory representations on a 9-point Likert-scale. An exclusively conceptual utterance would be scored as one and an exclusively perceptual utterance would be scored as nine. Utterances that were a combination of both were rated between two and eight depending on the weight of conceptual content. Buck et al. (2006) found a relationship between state dissociation and perceptual memories. Buck et al. (2006) used the code to investigate trauma narratives of 25 intensive care unit (ICU) patients in a Dutch hospital. Participants were asked about the cause for their stay and their time in

the ICU at two weeks and four months after discharge. The authors reported that both perceptual memory coding and posttraumatic dissociation were predictive of PTSD symptomology.

Another method to investigate predictors of PTSD symptomology is the number of omission and commission errors made during recall. For example, Candel et al. (2003) and Giesbrecht et al. (2007) investigated commission errors in relation to dissociation and found that commission errors (pseudo-memory or fabrication of non-existent details) were related to high dissociation. Giesbrecht et al. (2007) asked 62 undergraduate students to watch a five-minute fragment of a video before instructing them to write down everything they could remember. The results indicated that high dissociation affected commission errors, but not omission, with no difference in explicit memory recall.

Downs-Woolley (2019) used the word ‘elaboration’ as a coding metric to explain utterances in described events that had been recalled, yet had not appeared in the original narrative. The results did not indicate an increase in elaborations for those with high dissociation. Further research into commission as an effect of peritraumatic dissociation is needed.

Overall, results remain inconclusive when it comes to the effects of narrative detail in internal events, length and fragmentation. Although, external events, disorganisation and perceptual representation appear to affect trauma memories, commission errors were also implicated. This suggests that further investigations are necessary to fully understand the role of peritraumatic dissociation on peritraumatic memory through narratives.

Coherence and Narrative Length

Coherence is reviewed to measure holistic understanding and comprehension of the entire narrative or event rather than the specific narrative detail (Crespo & Fernández-Lansac, 2016; Halligan et al., 2002). Research into these areas is still inconsistent. Murray and colleagues (2002) investigated two samples of traffic accident survivors. They asked participants to rate memory for

fragmentation and used an experimenter rating system for contrast. A comparison between self-report and experimenter rated coherence (global fragmentation) showed a strong link between the experimenter rated score and PTSD severity. Similarly, Halligan et al. (2002) established a strong connection between data-driven processing and incoherence of narrative details. Incoherence one week after an event was found to be predictive of PTSD symptoms three months post-event (Halligan et al., 2003). In contrast, however, Buck and her colleagues (2006) expressed that narrative incoherence was only predictive of depressive symptoms, not PTSD. Although Buck et al. (2006) did report that incoherence immediately following trauma predicted later PTSD development, similar to the findings of Halligan et al. (2003).

Not all research, however, indicates coherence as an indicator of PTSD symptoms. Contrary to Buck et al. (2006), Rubin et al. (2004) examined 50 war veterans diagnosed with PTSD and found no evidence that PTSD symptoms were indicative of more incoherent memory. However, they conceded that their results do not reflect likely results immediately after trauma (Rubin et al., 2004). More recently, Rubin (2011) studied 15 undergraduate students diagnosed with PTSD and 15 without. They found no significant differences between the groups and/or in their level of coherence. Participants were asked to recall three memories: a traumatic memory, the most important, and the happiest memory from the past year. These were written out and coded through self-report and neutral observer rating. No difference regarding coherence was detected when comparing PTSD and non-PTSD participants as well as traumatic and non-traumatic events (Rubin, 2011). Although caution is needed when interpreting these results, given the small sample size.

Overall, memory coherence seems to indicate later PTSD symptomology when incoherence is present in the early stages (Halligan et al., 2002, 2003). However, evidence suggests that there is no difference for chronic PTSD when measuring it retrospectively (Rubin, 2011; Rubin et al., 2004). Narrative recall, in combination with posttraumatic stress, has revealed changes in narrative detail

and level of coherence. With limited research on commission and contradicting results in regards to narrative details and coherence, more research in these areas is needed to improve the understanding of peritraumatic dissociations and its effects in trauma memory.

Dissociation

The Role of Dissociation in the Onset of PTSD

Ozer and colleagues (2003) reviewed predictors of PTSD and found that peritraumatic dissociation was the most significant predictor of PTSD symptoms. A wealth of research consistently supports the strong association between peritraumatic dissociation, and PTSD (Bedard-Gilligan & Zoellner, 2012; Ehlers et al., 1998; Halligan et al., 2003). Dissociation manifests in different symptoms including depersonalisation (alteration in perception of self), derealisation (alteration in perception of the world), confusion of identity, amnesia, trances, and multiple identities (Brown, 2006; Cardena & Spiegel, 1993; van der Hart & Dorahy, 2009)

Definitions of Dissociation

Van der Hart and Dorahy (2009) describe the evolution of dissociation through five progressive views. Initially, dissociation was thought of as a splitting of personality or doubling in consciousness, Van der Hart and Dorahy (2009) point out that Freud then described dissociation as a defence mechanism. Then dissociation was viewed as a switching between parts of personality and a trauma response before it was described as a breakdown in integrated functioning. Currently, dissociation is seen as a continuum from normal to pathological symptoms (Van der Hart & Dorahy, 2009).

Cardeña (1994) terms dissociation in three categories: non-integrated mental systems; an alteration in consciousness with disconnection from the self; and a defence mechanism from danger or threat. The DSM-5 (APA, 2013) describes dissociation disorders as integration of consciousness, memory, or emotion that is interrupted or halted. These are frequently connected to

trauma and present as either intrusions into awareness and behaviour (such as depersonalisation and derealisation); or the loss of information or mental functions (such as amnesia; APA, 2013).

Models of Dissociation

Two models of dissociation are dominant in the literature. The unitary model suggests a single form of dissociation described on a single continuum from basic daydreaming to dissociative identity disorder (DID; Van der Hart & Dorahy, 2009; Brown, 2006; Carlson & Putnam, 1993; Holmes et al., 2005). Psychometrics are generally based on the unitary model, placing individuals within the spectrum depending on impairment and severity. However, concerns are expressed since psychometric testing does not encompass everybody who experiences dissociation (Brown, 2006).

Brown (2006) and Holmes et al. (2005) consider a unitary model as too broad for individual application and suggest a dichotomous model with two distinct and separate forms of dissociation. The dichotomous model of dissociation separates symptoms into two phenomena: detachment and compartmentalisation (Holmes et al., 2005). Detachment includes depersonalisation (e.g., out-of-body experiences), derealisation, altered consciousness, and emotional numbing, commonly associated with peritraumatic dissociation (Brewin & Holmes, 2003; Brown, 2006; Holmes et al., 2005; Ozer et al., 2003). Detachment is thought to cause encoding interruptions and disorganisation, fragmentation, as well as over-generality of trauma memories (Ehlers & Clark, 2000; Holmes et al., 2005).

Compartmentalisation involves the inability to access information and is present in symptoms like fugue, DID, hypnosis-induced behaviours, amnesia, auditory hallucinations and the feelings of being controlled by others. Emotions, cognitions, and actions are affected. Information is encoded but cannot be accessed or leads to intrusive symptoms (Brown, 2006; Holmes et al., 2005). Holmes et al. (2005) explain that detachment and compartmentalisation are seen as two entities but

concedes that there are exceptions, where separation is difficult, for example, with PTSD. This seems especially true in relation to peritraumatic dissociation.

Types of Dissociation

Dissociation can be understood in three different ways based on the time it occurs: trait, peritraumatic, and state dissociation. Trait dissociation reflects the more chronic type, which is indicated through problems with integrating experiences into consciousness. This might include the persistent use of dissociation following traumatic experiences (Merckelbach et al., 2003). Peritraumatic dissociation refers to dissociation occurring during or immediately after a traumatic event. Manifestations of peritraumatic dissociation include changes of perception during the traumatic event, such as out-of-body experiences, time slowing down, derealisation, emotional numbing, and a decrease in awareness of one's surroundings (Huntjens et al., 2013). The third type is state dissociation, which is similar to peritraumatic dissociation but generally refers to the degree of dissociation experienced in a specific moment in time, which is not necessarily linked to a traumatic event at the time (Dalenberg et al., 2012).

Peritraumatic Dissociation

Many studies suggest peritraumatic dissociation is a strong predictor of later PTSD symptoms that affect memory (Lyttle et al., 2010; Murray et al., 2002; Ozer et al., 2003). Most notably, peritraumatic dissociation affects encoding, but it has also been reported that perceptual and conceptual processing have a major effect on later intrusions, memory fragmentation and coherence (Ehlers & Clark, 2000; Buck et al., 2006; Corrigan et al. 2020). Bedard-Gilligan and Zoellner (2012) suggest that peritraumatic dissociation during trauma results in insufficient memory encoding. Persistent dissociation then prevents memory elaboration, which in turn leads to memory fragmentation, as part of PTSD symptoms.

Murray et al. (2002) aimed to investigate dissociative symptoms before, during, and after trauma in relation to PTSD. They interviewed 27 inpatients and 176 outpatients following a motor vehicle accident. Dissociation before, just after and four weeks after the accident predicted PTSD severity at six months. Zoellner et al. (2002) investigated peritraumatic dissociation as an interference with encoding when recalling traumatic memories. They asked 28 female sexual and nonsexual assault victims, who were seeking treatment for chronic PTSD, to recount their assault. Participants were split into two equal groups of 14 based on the median split of the Peritraumatic Dissociative Experiences Questionnaire score. Their trauma narratives were coded in utterances, based on Foa et al. (1995), with measures to identify dissociative utterances. As expected, the high dissociation group included more dissociative utterances and their memory structure was influenced. Peritraumatic dissociation was also related to more intrusions at post-treatment.

Experimentally Controlled Dissociation

Over the years, methods of inducing dissociation in the laboratory have been assessed. Miller et al. (1994) used two techniques to experimentally induce dissociation; a small black dot placed on a wall at a 2 metre distance that participants were asked to stare at, or a mirror placed on the participant's lap, where they were instructed to stare into their own eyes. Both successfully induced high levels of dissociation in panic disorder participants but also low levels of dissociation in non-clinical individuals. Leonard et al. (1999) also used the dot staring method and introduced a pulsing light and ticking audio stimulation in a multi-modal combination. A stimulus deprivation group was also set up by Leonard et al. (1999), where participants wore blacked-out goggles and headphones, eliminating sight and noise. While the pulsing lights had the highest dissociation, the deprivation control group was surprisingly more effective at producing dissociation than the dot starring condition.

Lickel et al. (2008) had 11 experimental groups including hyperventilation, dot and mirror starring, a spiral (modified spinning dot), strobe lights or a combination of methods. They found that hyperventilation and a combination thereof with most other forms, such as spiral staring were superior to the validated dot or mirror staring versions in producing dissociation. Dorahy et al. (2016) combined the spiral and dot versions to create a black dot surrounded by spiralling and spinning lines. The results revealed that the spinning dot was successful at inducing dissociation (Dorahy et al., 2016).

The inducing of dissociation in an experimental setting has been successful (Leonard et al., 1999; Lickel et al., 2008), with multiple studies using this induction to investigate the effect of dissociation on memory processing. However, a meta-analysis (Marks et al., 2018) investigating dissociation during encoding in experimental settings and intrusive memories and distress found limited evidence of its success. Marks et al. (2018) concluded that it is uncertain if manipulated dissociation states can truly re-create natural dissociation and suggest that even retrospective reports yield mixed findings across studies. More research into experimentally controlled dissociation is needed.

Analogue Trauma and the Trauma Film Paradigm

It is not possible to induce trauma in an experimental setting, therefore, retrospective or analogue studies are often used to assess trauma responses. Analogue studies endeavour to mimic or replicate real-life situations in controlled conditions (Kindt & van den Hout, 2003). Several ways of inducing analogue trauma have been developed, including the Trauma Film Paradigm. The Trauma Film Paradigm (TFP) is a prospective tool to study both exposure and reactions to analogue/simulated psychological trauma (Emily A. Holmes & Corin Bourne, 2008; James et al., 2016). The TFP generally involves exposure to a distressing short film (Halligan et al., 2002; Emily A. Holmes & Corin Bourne, 2008).

Halligan and colleagues (2002) used a 12-minute video clip as an analogue to a trauma event. The clip showed the aftermath of car accidents and was very graphic. In the first study 30 participants were asked to focus on the conceptual part of the story and remember as much of the storyline as possible, and 31 participants were instructed to focus on data-driven parts of the story, such as images and sounds. Participants were asked to return one week later for a free recall session where they recalled as much of the clip as they could remember. In a second study, Halligan et al. (2002) predetermined the participants' group allocation by controlling for their cognitive processing. Twenty-eight participants were chosen for the data-driven and 29 for the conceptual group. Both studies revealed that data-driven processing influenced incoherence and disorganised recall, as well as an increase in intrusions. While the first study failed to show analogue PTSD symptoms, the second study was successful at inducing analogue PTSD symptoms.

Several studies have successfully used TFP to investigate PTSD symptoms. For example, Kindt and van den Hout (2003) reported increased memory fragmentation in those who dissociated when watching a TFP than those who did not dissociate. Ball and Brewin (2012) asked participants to reflect on the TFP for a week and found more intrusions compared to the control group who did not reflect on it. More recently, Sachschal et al. (2019) examined the effect of the TFP on recall and disjointedness (coherence). Sixty participants watched a ten-minute trauma film clip while 30 participants watched a neutral clip. Those participants watching the trauma film had greater disjointedness during difficult moments of the clip but better overall recall of the clip than the neutral group. Results indicate that cognitive processing and coherence were connected to intrusions and PTSD symptoms one week after exposure.

Dorahy et al. (2016) used an audio-only version of the TFP in order to simultaneously enlist a visual dissociation induction task (spiral dot/mirror starring). Sixty participants (47 females) were divided into three groups: watching a spinning dot, looking at themselves in a mirror, or looking at

neutral images on a computer screen. At the same time participants were either listening to a traumatic or a neutral control narrative. Results showed that peritraumatic dissociation increased perceptual priming and led to more distressing intrusions, however, conceptual priming was not affected.

Downs-Woolley (2019) in cooperation with Faulkner (2019) also used an audio version of the TFP and visual induction of peri-experimental dissociation. The study was the first to examine the influence of peri-experimental dissociation at the encoding and retrieval phases of analogue trauma memory processing. Specifically, it aimed to explore if peri-experimental dissociation at encoding and during retrieval impacted the trauma narrative and therefore affected PTSD symptom development. Unexpectedly, the dissociative induction was not successful. The inclusion of a visuospatial task (hitting a keyboard button when a cross appeared randomly) during the dissociation induction was implicated as a potential cause for the induction failure since Holmes et al. (2004) discovered that visuospatial tapping could decrease dissociation. Krans et al. (2010) also found a reduction in state dissociation in their visuospatial interference group. Downs-Woolley (2019) reorganised the groups based on self-reported dissociation at encoding and retrieval. The dissociation group revealed more fragmentation in the second study but no differences in the third study for any narrative details. Consistent with previous work (ref), coherence, intrusion and priming did not show any differences in groups.

In order to understand the effects of dissociation at encoding and retrieval of traumatic narratives, it is vital to effectively induce dissociation in the laboratory. The current study therefore, hopes to provide a unique insight into peri-experimental dissociation during the encoding of trauma and state-dissociation during retrieval. In doing so, this research is expected to help with understanding of the effects of dissociation during different stages of trauma memory processing.

The Present Study

The intention was to incorporate knowledge from the existing literature on dissociation and PTSD to develop a theoretically-based dissociation induction paradigm to investigate the effects on dissociation on memory and later PTSD development. This study is intended to replicate and expand upon the combined study by Downs-Woolley (2019) and Faulkner (2019). Using their results, the method has been adapted to optimise the likelihood of successfully inducing dissociation in our experimental groups. The visuospatial task has been omitted to reduce the negative effect it had on dissociation. In addition the size of the centre of the spinning dot has been reduced, to ensure more focus on the centre of the dot. A mask between the neutral pictures was added, to ensure dissociation is not achieved in the comparison (picture) group. A dedicated baseline was used to indicate if the dissociation task and mask were successful. This approach has several advantages but in particular it allows the possibility of effectively measuring dissociation in a laboratory setting without compromising the well-being of our participants. Effective dissociation should then reveal a clearer understanding of dissociation effects at encoding and retrieval of trauma narratives.

The aim of the present study was to investigate the impact of peri-experimental dissociation on analogue trauma memory during encoding and recall. It was intended that the spinning dot would allow us to investigate the effect of dissociation during the encoding and recall of a trauma narrative. The identical trauma narrative used by Downs-Woolley (2019) was presented to participants while in one of three conditions (watching a spinning dot, watching pictures in a comparison group, or no visual stimuli in the control group). Three days later the narrative was recalled by participants while subjected to one of the three conditions. This investigated dissociation effects during retrieval of analogue trauma memories. The use of an intrusion diary for the three days before the recall session was expected to increase intrusions and their distress. Overall, this study was expected to provide a unique insight into peri-experimental dissociation during encoding of trauma, and state-dissociation

during retrieval is expected to understand the impact of dissociation in the different stages of analogue trauma memory functioning. The following hypotheses were therefore proposed:

Hypothesis One

The modified spinning dot was expected to induce more dissociation than the comparison (neutral pictures) and control (no- visual task) group (Dorahy et al., 2016).

Hypothesis Two

Dissociation during encoding would increase intrusions and intrusion distress compared to the comparison and control groups. This was measured through the intrusion diary and is supported by previous research (Brewin et al., 1996; Ehlers & Clark, 2000)

Hypothesis Three

Recall of trauma narratives following dissociation (during encoding and at retrieval would be associated with more fragmentation and disorganisation. Low dissociation would have more integration and organisation (Brewin et al., 1996; Ehlers & Clark, 2000; Foa et al., 1995)

Hypothesis Four

The overall narrative comprehension would be affected with higher dissociation at encoding and retrieval resulting in more narrative incoherence and less narrative details overall (Foa et al., 1995), as well as higher perceptual processing related scores (Buck et al., 2006).

Hypothesis Five:

Higher dissociation would be associated with increased perceptual priming, and reduced conceptual priming, as assessed by the word-stem completion task and word-cue association task, respectively (Lyttle et al., 2010)

Method

Participants

Participants were 164 university students. Inclusion criteria were 1) being a current university student over the age of 17, and 2) having normal or adjusted to normal hearing and vision. Eight participants were excluded due to age (n = 1), failing the validity questions (n = 4), not attending the second session (n = 2), and withdrawing at the baseline task (n = 1). Of the remaining 156 participants, 88 students were recruited through a psychology 100-level student participant pool and volunteered for course credits. The remaining 68 students responded to a flyer (Appendix A), advertising the study in exchange for a $5 coffee voucher for session one and a $10 shopping voucher for session two. The sample contained 126 females and 33 males, ranging in age from 18 – 55, with a mean age of 23.36 years (SD = 7.07).

Materials

Materials consisted of an audio clip, visual stimuli (differed for each experimental group), an intrusion diary, and a battery of questionnaires.

Audio Version of the Trauma Film Paradigm (TFP)

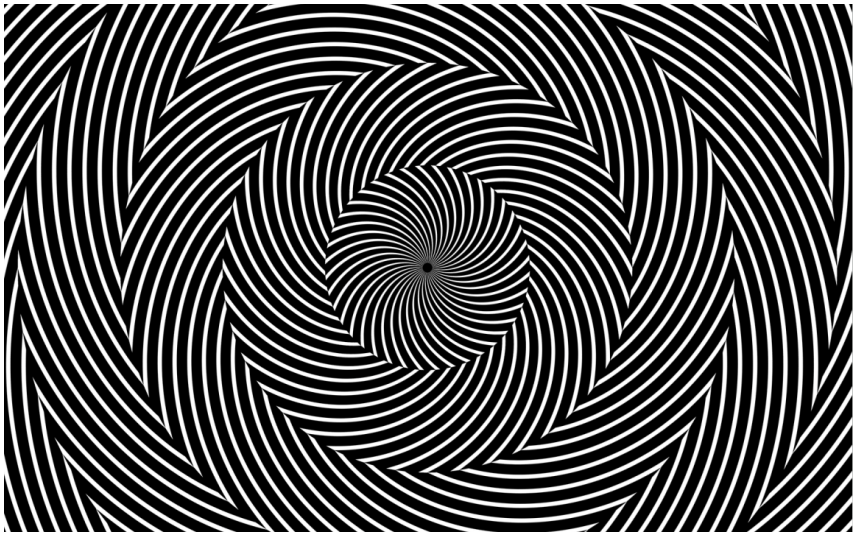
The audio clip was identical to the one applied by Downs-Woolley (2019). The narrative involved a potentially distressing account of an American journalist kidnapped, tortured, and eventually beheaded by terrorists. The narrative was based on a true story originally published by The New York Times as "The Horror Before The Beheadings" (Callimachi, 2014). It drew on information from other captives and witnesses. The narrative developed for this study focused on the capture, torture episodes and eventual execution of the journalist. The narrative was recorded by an American actor and was eight minutes and fifteen seconds long. Participants used Sennheiser headphones to listen to the story. The entire manuscript is in Appendix B.

Visual Stimuli

Two experimental visual tasks, one involving a spinning dot and the other moving pictures were utilised, as well as a non-visual control condition. The 24-inch computer monitor displaying the visual tasks was placed on the end of a standard computer desk from where the participants were sitting, ensuring a minimum one-meter distance between participants and the screen.

Spinning Dot. The spinning dot was an adaptation of the original spinning dot used by Dorahy et al. (2016). It was a streamlined version, which involved four monochromatically striped concentric circles, which moved in different directions. The black dot in the centre itself was reduced from eight mm to four mm to ensure a more intense focus on the dot itself (Figure 1). The spinning dot entirely covered the screen.

Figure 1
Static Image of the Spinning Dot Task

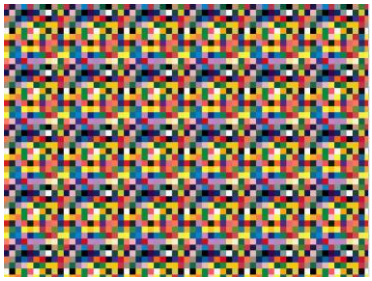


Pictures Task. The pictures used in this task were identical to those used by Downs-Woolley (2019). They were a compilation of pictures from the International Affective Picture System (IAPS; Lang et al., 2008; Lang et al., 1999). Each picture was set in a random order, never

appearing twice in the same session, and moving in random locations on the screen. The images chosen were concentrated in the neutral range regarding both valence and arousal, indicating a neutral affect. Images were displayed on the screen for 3-second intervals before moving to the next image. A visual mask of coloured pixels was added to the picture task. It appeared randomly across the whole screen for 500ms after every 3-10 images to reduce participants' likelihood of getting absorbed in the stimuli and experiencing detachment/dissociation. Example images are provided in Figure 2A and 2B. The visual mask is presented in Figure 2C.

Figure 2

Example Images and the Mask Used in the Pictures Task

A  B  C 

Note. Images A & B: Example images used in the picture task. Image C: Visual Mask

Control Condition. The control group had no visual manipulation. The screen was black for the duration of the tasks. There was no requirement to look at the screen or to have eyes open or shut.

Intrusion Diary

An intrusion diary (see Appendix C) was supplied to participants after the first session to record intrusions. The diary was in A5 booklet form and had a page for each of the three days starting immediately after session one. For each intrusion participants recorded the time the intrusion happened, and a short description of the intrusion. The diary also asked participants to rate the intrusion, the emotion type for each intrusion and how distressing it was. The intrusion type covered three options: visual, audio, or audio and visual. The emotional type had 13 options,

including anger, joy, and sadness, of which participants chose at least one. The distress scale operated on an 11-point scale from *totally relaxed* (0) to *highest emotion I have ever felt* (10).

Questionnaires

Participants were asked to complete a range of questionnaires measuring trait and peritraumatic dissociation, PTSD, state anxiety, demographics, and validity.

The Dissociative Experiences Scale-II (DES-II; Carlson & Putnam, 1993). The DES-II (Appendix D) is a 28-item self-report questionnaire measuring trait dissociative experiences and symptoms. A sample question is, "Some people have the experience of being accused of lying when they do not think that they have lied". Participants respond to each question on an 11-point scale from *never* (0%) to *always* (100%). In the current study, Cronbach's alpha for the DES-II was $\alpha = .95$.

Dissociative Experiences Scale-II Taxon (DES-T; Waller et al., 1996). A subset of items from the DES-II was used, focusing on eight items (items: 3, 5, 7, 8, 12, 13, 22, and 27) to detect pathological dissociation. A sample question is, "Some people have the experience of finding themselves in a place and having no idea how they got there". The DES-T Cronbach's alpha in the current study was $\alpha = .83$

Peritraumatic Dissociative Experiences Questionnaire (PDEQ; Marmar et al., 1997). The 10-item questionnaire is measuring peritraumatic dissociation. The PDEQ was administered to assess peri-experimental dissociation at the baseline, encoding and retrieval phase (Appendix E). It was adapted for the purposes of the current study. Two questions were omitted, "I ended up doing things that I later realised I had not actively decided to do" and "I was surprised to find out afterwards that a lot of the things happened at the time that I was not aware of", due to irrelevance to the tasks. Two questions were added, "I have gaps in my memory and cannot remember parts of the narrative" and "I felt emotionally numb; that is, there were moments during the narrative where I did

not feel any emotions, or felt emotionally empty". Participants responded on a 5-point scale from *not at all true* (1) to *very much true* (5). In the current study, Cronbach's alpha for the *PDEQ was* α = .85-.88

Impact of Events Scale – 6 (IES-6; Thoresen et al., 2010). The IES-6 (Appendix F) is a shortened form of the Impact of Events Scale-Revised (IES-R; Weiss, 2004) with six items such as: "I had trouble concentrating", and is measured on a 5 point scale from *not at all* (1) to *extremely* (5). The IES-6 was used to determine if the narrative produced PTSD symptoms and had reliability of α = .80.

State-Trait Anxiety Inventory-6 (STAI-6). The STAI-6 (Appendix G) is a six-item short form of the Spielberger State-Trait Anxiety Inventory (STAI; Marteau & Bekker, 1992) that measures state anxiety. A sample question is, "I feel upset", and is measured on a 4-point scale from *not at all* (1) to *very much* (4). It was used to assess anxiety at each phase, and reliability was between α = .77 and α = .87.

Depression, Anxiety and Stress Scale-21 (DASS-21; Lovibond & Lovibond, 1996). The Dass-21 (Appendix H) is a 21-item short form of the full 42-item Depression, Anxiety and Stress Scale (DASS). A sample question is, "I found it hard to wind down", and was responded to on a 4-point scale from *did not apply to me at all* (0) to *applied to me very much or most of the time* (3). It was used to assess trait depression, anxiety and stress. The overall reliability for the DASS-21 was α = .90. Reliability for the subscales was Depression α = .87, Anxiety α = .76, and Stress α = .83.

Demographic questions. Gender, ethnicity, and education were acquired through dropdown boxes. Enquires into hearing and vision impairments, previous traumatic incidences and mental health diagnosis had yes or no options and open-ended descriptor items if confirmed. Age was obtained by typing the age in years.

Validity Questions. To assess participants' engagement in the task, validity questions were added at different stages of the experiment (Appendix I). An 11-point Likert scale from *not at all* (0) to *completely* (10) was used to measure focus and attention during the TFP, with questions, such as, "How much were you fully able to focus on or attend to the spinning dot or pictures". Additionally, questions, such as, "If you are reading this question, select answer number 3" were inserted to ensure participants were fully engaged with the questionnaire and were not responding randomly.

Narrative Measures

Narrative coding was based on participants' retrieval in session two of the details given in the audio clip in session one. The recall of each participant was transcribed and coded. The original transcript of the TFP and the transcribed narratives of each participant were divided into utterances. This measure was created by Downs-Woolley (2019) and is based on the Logical Memory Recall Task of the Wechsler Memory Scale – fourth edition (WMS-IV; Wechsler, 2009). Each utterance comprised a part of a sentence with one action or thought. For example, the sentence, "He went to a computer, sat only for a few minutes before leaving" was split into three utterances: "He went to a computer" (1) "sat only for a few minutes" (2) "before leaving" (3). These utterances were used to code the narrative codes, overall coherence, as well as perceptual and conceptual processing.

Narrative Codes. The utterances were coded and computed using a coding schedule created by Downs-Woolley (2019), which includes 21 individual coding options from nine different categories (Appendix J). A priority system was used to appoint the right code for utterances, which could fit multiple codes. Each code was transformed into a percentage for later comparison.

Narrative Categories. The 21 codes were reduced into eight categories in preparation for data analysis, identical to the categories introduced by Downs-Woolley (2019), with the addition of a new category that was created for this study: Death Omission. The total of each category was the sum of the percentage scores of the codes included within the category, as displayed in Table 1.

Table 1
Data reduction compositions

Category	Codes
Fragmentation	Repetition, Unfinished Thoughts, and Speech Fillers
Disorganisation	Confusion, Disorganised Thoughts, Disjointedness and Repetition.
Organisation	Organisation
Elaboration	Elaboration
Omission	Omission
Internal Events	Organised Thoughts, Disorganisation Data Reduction, Desperate Thoughts, Unfinished Thoughts, Negative Affect
External Events	Action Perpetrator, Action Character, Action Other, Dialogue Perpetrator, Dialogue Character, Dialogue Other, and Correct Facts
Death Omission	Commission, omission or inclusion of death

Death omission investigated the processing of the death of the narrator in the narrative. The narrative explains the capture, torture and death of the person in the narrative. Scores reflect whether participants recalled the death correctly, partially remember facts or totally omit the death occurring. Commission measures the replacement of death with a pseudo memory. The following five-point scale, shown in Table 2, was developed to investigate the specific part of the narrative.

Table 2
Scoring for the New Category Death Omission

Score	Code	Description
0	Fact	Mentions knife/sword and death
1	Omission Conceptual	Mentions death, but not knife/sword
2	Omission Perceptual	Mentions knife/sword but no death
3	Total Omission	No knife/sword or death
4	Commission	Untrue event – shot, freed

Narrative Details. The original TFP script was divided into 146 utterances. The utterances of each participant's transcript were numbered and marked in the narrative details sheet (Appendix K), which indicated disorganisation and flow. If an individual's utterances were more than five utterances out of order, such as utterance 45 being recalled before utterance 30, then they were considered out of sequence. The number of utterances per participant for each section, and overall, were added together to create a score.

Narrative Coherence. Halligan et al. (2003) created the measure of coherence used in this study. Flow, changing the subject, unfinished sentences and incomplete order indicated incoherence as collected in the narrative details sheet. Halligan et al. (2003) established a global coherence question, which was also used in this study. The 7-point scale addressed how disorganised the text was on a scale from *none* (1) to *almost all* (7). Rather than relying on the coders to choose a number, the formulation created by Downs-Woolley was applied. The calculation takes into account the number of utterances recalled overall, the narrative details, and utterances that were out of sequence. The final score was divided by 14 to ensure an appropriate score in relation to the 7-point Likert scale. The formulation used was as follows:

$$X = Number\ of\ Utterances - Narrative\ Details$$
$$Y = X + Out\ of\ Sequence\ Details$$
$$Z = Y/Number\ of\ Utterances$$
$$Narrative\ Coherence = Z/14$$

Perceptual and Conceptual Coding. Each utterance was coded on a 9-point Likert scale (Buck et al. 2006; Kindt et al., 2007) from 1 (*exclusively conceptual*) to 9 (*exclusively perceptual*). Perceptual representations included sensory information, descriptions of the event and surroundings, as well as explanations by others. Conceptual representations involved explanations of why events developed and explained feelings. To create an overall score, the individual results were averaged together.

Priming Measures

Two implicit memory paradigms, the word-stem completion task (WST) and the word-cue association task (WAT), measured perceptual and conceptual priming, respectively. Both have been successfully used by Lyttle et al. (2010) with respect to perceptual and conceptual processing. The Corpus of Contemporary American English was utilised to choose words based on the total frequency per million in the English language (https://corpus.byu.edu/coca/; Appendices L and M).

Words and word stems were displayed in the centre of the screen preceded by a 2-second fixation cross. The verbal response by the participant initiated the next word.

WST. For the WST, participants were presented with a word stem (e.g., ta__) and asked to say out loud the first word that came to mind (e.g., taxi). The fifteen words in this task were separated into three lists of five words each: Target Threat, Non-Target Threat and Target Neutral. Targets were words used in the original narrative, while non-target words were not mentioned in the story. Each stem could have a threat or neutral match, where threat referred to the emotional loading of the word, such as poi___, where poison was a threat, while poise was a neutral response. An example of the Target Threat list involved the stem mis___, which could be completed with *misery* (target) or *mister* (match). A Non-Target Threat example included bul___, which could have resulted in *bullet* or the neutral match *bull*. Target Neutral words involved words that were in the narrative but not an emotional threat, such as ca__, where the answers could have included *café* (target) or *castle* (match).

WAT. The WAT provides participants with a word (e.g., sand) designed to cue another target word (e.g., desert) previously heard in the story. They were asked to mention the first word which comes to mind after seeing the cue word. The word lists were again split into three lists based on the separation used in the WST. An example of the Target Neutral word list is *patient* with the target word associated being *hospital*. A Target Threat word being presented was *torment* with the target word of *torture*. Non-Target Threat cues included *blast*, with the target word *bomb*. Successful retrieval is based on conceptual processing due to semantic retrieval cues.

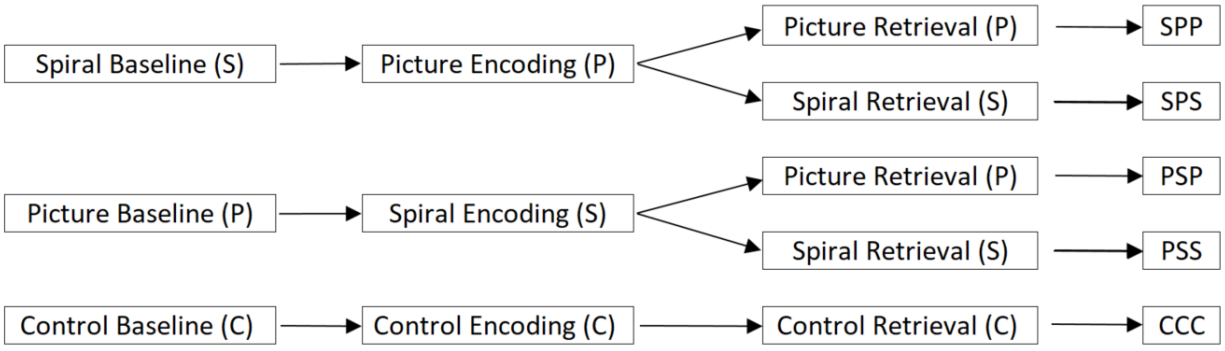
Procedure

The study was set over two sessions, two full days apart. After initial signup through the participant pool or via email, participants were sent an email containing the information sheet (see Appendix N) and directions to the laboratory. A reminder was emailed out the day before

attendance. The study was approved by the University of Canterbury Human Ethics Committee (HEC2018/12 – Amendment 1; Appendix O).

Participants were randomly (sequentially) assigned to one of five experimental conditions. The baseline phase determined their encoding phase to avoid practice (familiarity) effects. Participants who started with the spinning dot (S) at baseline received the pictures (P) at encoding and vice versa (SP and PS). Each of those two paths had one of the two visual tasks added at the retrieval session, leading to four possible experimental paths: SPS, SPP, PSP and PSS. The control group received no visual stimuli at any of the phases (CCC; See Figure 3).

Figure 3
Five Pathways for Experimental Conditions



Session One

Upon arrival, participants read the information sheet with the option of asking questions, and completed the consent form (Appendix P). Participants were informed that the session would be completed on the computer and the lights were dimmed to ensure a stronger focus on the screen.

Baseline. In the baseline period, participants completed one of the experimental conditions: spinning dot, moving picture or control. Instructions were given on the screen as well as being reiterated verbally. For the spinning dot, participants were asked to focus entirely on the black dot in the middle of the screen, while participants in the picture condition were asked to follow the pictures with their eyes. Participants in the control group were asked to sit quietly. All participants were told

that a slide on the screen would indicate when the baseline period (three minutes) was over. Following the baseline task, the first set of questionnaires were presented. The PDEQ and STAI-6 were completed first, followed by demographic questions, the DES-II and the DASS. All self-report measures were administered via Qualtrics^{XM} software (April 2019 to March 2020; Qualtrics, Provo UT).

Encoding. Instructions were again given on the screen as well as being reiterated verbally, encouraging the focus of the eyes on the visual tasks, or sitting quietly for the control group. Headphones were fitted, and participants adjusted their volume. The presentation started with a ten-second display of a photo depicting the main character in the narrative just before he died (a man kneeing in an orange jump suit with his captor standing over him with a knife). Following this image, the visual tasks began, or a blank screen was presented for the control group. The story then started after a 20-second delay to ensure participants were acclimatised to the visual stimuli. The narrative task was followed by completion of the PDEQ and the STAI-6.

Priming. The WST and WAT were administered - alternating for each participant to control for administration order effect. Participants were shown instructions on the screen and completed two practice words per task. The verbal response to each stimulus was recorded through Cronos software and written down by the experimenter.

Intrusion Diary. The diary was introduced to participants by explaining what intrusions are and where and how to record these. A page with an example was shown, and participants were asked to read the instructions on the first few pages carefully. Participants were asked if they had any questions and were encouraged to carry the diary with them at all times. The dates and times of both the first and second sessions were recorded in the diary. At the conclusion of the session the appointment for the second session was confirmed and vouchers were handed out to those who

volunteered (i.e., not those from the participant pool), while credits for the students from the pool were credited immediately after the session finished.

Session Two

Upon arrival, the intrusion diary was collected. The session started with assessment questions addressing how much participants believed they remembered of the story. The retrieval task was then explained on a slide and reiterated verbally. Participants were reminded that the picture of the man in the narrative would be presented for ten seconds. Twenty seconds into the visual stimuli (or no stimuli for the control group) the participants were asked to recount as much of the story as they could remember, in the correct order. The recall was recorded as an audio file for later transcription. When participants stopped for a prolonged time or mentioned that they could not remember any more, they were asked if there was anything that they wanted to add. Once the retrieval was finished, the PDEQ and the STAI-6 were randomly administered. Upon completion, participants were provided with the debrief form (Appendix Q), and a brief description of the study, its aims and hypotheses, before being given the opportunity to ask questions. Vouchers and credits were presented at the conclusion of the session.

Research Design and Data Analysis

All data were analysed using IBM Statistical Package for the Social Sciences (SPSS) version 26. Extreme outliers were screened for and winsorised to the next highest score for the few occasions they were evident. In cases where the data was not normally disturbed, non-parametric measures were used. For parametric analysis, the Greenhouse-Geisser statistic was used for mixed design analyses. The Gabriel posthoc test was used throughout the analysis due to large variations in group sizes.

To ensure that the coding was accurate, 50 transcripts were blindly double-coded by a previously trained assistant. An additional ten transcripts were previously coded independently and

used as a practice to investigate discrepancies. Intraclass correlations were measured for all narrative category percentages, as well as the perceptual and conceptual coding scores. The average measures of the intraclass correlations were between .91 and .99. Discussions between raters in retrospect solved inconsistencies.

One-way analysis of variances (ANOVA) was conducted for the manipulation check at each phase (baseline, encoding, retrieval) to examine the effect of the stimuli on dissociation scores (PDEQ).

The primary design was initially a 3 (phases: baseline, encoding, retrieval) x 3 (condition: spinning dot, pictures, control) mixed-design. However, the manipulation of dissociation was not successful, so ratings of peri-experimental dissociation were used as the independent variable and so the design was a 2 (time: encoding, retrieval) x 4 (dissociation groups: high and low dissociation at encoding, high and low dissociation at retrieval).

The primary dependent variables were: frequency and distress of intrusions across the three days (day1, day2, day3), narrative details, length and coherence, and priming (i.e., WST, WAT).

All parametric analyses were also run using analysis of covariance (ANCOVA) with IES-6, DES, as well as the validity measures for focus, anxiety, understanding, fragmentation, and talking to more sensitively assess the hypotheses.

Results

Manipulation Check

Hypothesis One: Dissociation Through Spinning Dot

Hypothesis one acted as a manipulation check to examine if the spinning dot induced peritraumatic dissociation at the baseline session (see Table 3). A one-way between-subjects ANOVA found a significant effect for the stimuli on PDEQ scores, $F(2, 153) = 15.38$, $p < .001$, $\eta_p^2 = .17$. Post hoc comparisons using Gabriel indicated that the spinning dot produced significantly

more dissociation than the picture ($p < .001$) and control groups ($p < .001$, Table 3). Thus, supporting hypothesis one, the improved spinning dot was effective in inducing dissociation relative to the other conditions.

Table 3
The Number (n), Mean (M) and Standard Deviation (SD) of the Peritraumatic Dissociation Scores at All Three Phases

	Control		*Pictures*		Spinning Dot		*Total*	
	n	*M (SD)*	*n*	*M (SD)*	*n*	*M (SD)*	*N*	*M (SD)*
Baseline PDEQ	33	18.48 (6.70)	62	19.89 (6.86)	61	25.74 (7.44)	156	21.88 (7.69)
Encoding PDEQ	33	19.76 (6.54)	61	23.51 (8.59)	62	22.47 (8.81)	156	22.30 (8.36)
Retrieval PDWQ	33	19.73 (6.93)	62	21.66 (8.38)	61	22.89 (7.85)	156	21.73 (7.93)

However, once the narrative was added in the encoding phase the spinning dot condition no longer produced higher dissociation, $F(2, 153) = 2.21$, $p = .113$, $\eta_p^2 = .03$. A similar finding was evident at the retrieval phase, with no difference between the groups, $F(2, 153) = 1.72$, $p = .183$, $\eta_p^2 = .02$ (Table 3). Independent-samples t-tests were conducted to compare dissociation at baseline and at encoding for the pictures and the spinning dot group. There was a significant difference in the scores for the PDEQ scores in the picture group at baseline and encoding conditions; $t(121) = -2.56$, $p = .011$. A significant difference in the scores for the spinning dot group was also found between baseline and encoding conditions; $t(121) = 2.22$, $p = .028$ (see Table 3 for means and standard deviations). Comparing the control group at baseline and encoding was not significant, $t(64) = -.78$, $p = .438$.

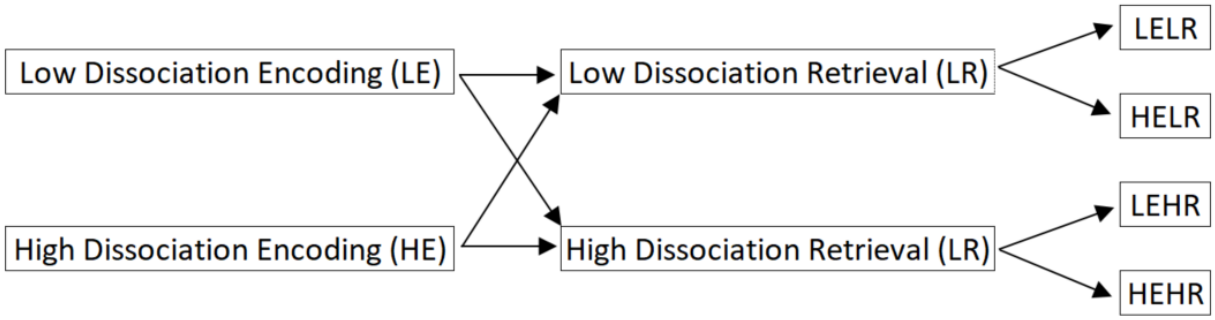
Adjusted Dissociation Groups. Seemingly, adding the narrative, impedes the spinning dot from producing heightened dissociation in the key phases of encoding and retrieval. Due to the emphasis of the study on dissociation during those two phases, the participants were split into groups according to their level of self-reported peri-experimental dissociation while doing the task.

The median of the peri-experimental dissociation scores for encoding and retrieval were used to split participants into four groups, depending on their reported level of dissociative experience in

each phase. The PDEQ median of ≥ 22 was used to differentiate high from low groups in both the encoding (Low dissociation at Encoding, LE; High dissociation at Encoding, HE) and retrieval (Low dissociation at Retrieval, LR; High dissociation at Retrieval, HR) phases. Thus, the final four groups were LELR, LEHR, HELR and HEHR (See Figure 3).

Figure 4

Four Adjusted Pathways for Experimental Conditions Based on Encoding and Retrieval Stages



Demographics

Dissociation Groups. A one-way between-subjects ANOVA found no effect of age, $F(3, 152) = 2.48$, $p = .063$, $\eta p2 = .047$. Chi-squared analysis for education showed no difference between the dissociation groups, $\chi 2$ (3, N = 156) = 2.11, $p = .55$. However, the chi-squared analysis for gender showed a significantly higher proportion of the LELR group were male compared to other groups $\chi 2$ (3, N = 156) = 8.88, p = .031 (see Table 4). A Pearson correlation examining gender across key dependent variables showed significant correlations in the narrative category 'external events' ($r = -.212$, $p = .01$), as well as the variables for Intrusion Distress on Day 1 ($r = .288$, $p = .01$) and Day 2 ($r = .196$, $p = .05$; see Appendix R). Therefore, gender was added as a covariate to the assessment of those three measures when re-exploring the data using ANCOVA (see Appendix S).

Table 4

Descriptive Statistics of Demographic Information Showing the Number (n) and Percentage (%) for the Dissociation Groups for Gender, Ethnicity and Education. Age is Displayed in Mean (M) and Standard Deviation (SD)

		LELR *n / M (%/SD)*	LEHR *n / M (%/SD)*	HELR *n / M (%/SD)*	HEHR *n / M (%/SD)*	Total *N/ M (%/SD)*
Participants		60 (38.5)	18 (11.5)	18 (11.5)	60 (38.5)	156 (100)
Age		25.1 (8.7)	22.5 (7.1)	20.6 (3.2)	22.7 (5.6)	23.4 (7.1)
Gender	Male	20 (33.3)	2 (11.1)	2 (11.1)	9 (15.0)	33 (21.2)
	Female	40 (66.7)	16 (88.9)	16 (88.9)	51 (85.0)	123 (78.8)
Ethnicity	NZ European	41 (68.3)	13 (72.2)	11 (61.1)	36 (60.0)	101 (64.7)
	NZ Maori	1 (1.7)	1 (5.6)	1 (5.6)	1 (1.7)	4 (2.6)
	Pacifica	0 (0)	0 (0)	2 (11.1)	3 (5.0)	5 (3.2)
	Asian	11 (18.3)	2 (11.1)	2 (11.1)	17 (28.3)	32 (20.5)
	Other	7 (11.7)	2 (11.1)	2 (11.1)	3 (5.0)	14 (9.0)
Education	Undergraduate	41 (68.3)	12 (66.7)	14 (77.8)	47 (78.3)	114 (73.1)
	Postgraduate	19 (31.7)	6 (33.3)	4 (22.2)	13 (21.7)	42 (26.9)

Trauma. The trauma data is displayed in Table 5. Chi-squared analysis showed no difference between the dissociation groups for having experienced a trauma or not, χ^2 (3, N = 156) = .72, p = .87. Level of distress still experienced from trauma history, however, was significant, F(3, 63) = 3.99, p = .012, η_p^2 = .160. Post-hoc tests indicate the HEHR reporting more distress about past trauma than the HELR group (p = .02).

Table 5

Descriptive Statistics for the Number (n) and Percentages (%)) for the Dissociation Groups in Regards to Trauma Experience and Type. Distress is Displayed in Mean (M) and Standard Deviation (SD)

		LELR *n//*M (%/SD)	LEHR *n//*M (%/SD)	HELR *n//*M (%/SD)	HEHR *n//*M (%/SD)	Total *N//*M (%/SD)
Trauma	No	37 (61.7)	11 61.1)	13 (72.2)	38 (63.3)	99 (63.5)
	Yes	23 (38.3)	7 (38.9)	5 (27.8)	22 (36.7)	57 (36.5)
Type*	Interpersonal	3 (13.0)	1 (14.3)	2 (40.0)	11 (50.0)	17 (29.8)
	Not Interpersonal	20 (87.0)	6 (85.7)	3 (60.0)	11 (50.0)	40 (70.2)
Distress		2.28 (1.72)	2.50 (2.55)	1.43 (1.27)	3.64 (1.60)	2.73 (1.90)

Mental and Other Medical Health. Chi-squared analysis showed no difference between the dissociation groups and a mental health diagnosis, χ^2 (3, N = 156) = 4.10, p = .25 (Table 6). Chi-squared analysis was not conducted for the type of mental health diagnosis, vision, hearing, or memory problems due to small counts in several cells.

Table 6

Descriptive Statistics for the Number (n) and Percentages (%)) for the Dissociation Groups in Regards to Mental and Other Medical Health

		LELR *n (%)*	LEHR *n (%)*	HELR *n (%)*	HEHR *n (%)*	Total *N (%)*
MH Dx	No	51 (85.0)	13 (72.2)	12 (66.7)	50 (83.3)	126 (80.8)
	Yes	9 (15.0)	5 (27.8)	6 (33.3)	10 (16.7)	30 (19.2)
Dx Type	Dep	2 (22.2)	2 (40.0)	1 (16.7)	4 (40.0)	9 (30.0)
	Anx	3 (33.3)	1 (20.0)	2 (33.3)	2 (20.0)	8 (26.7)
	Dep/Anx	0 (0)	2 (40.0)	1 (16.7)	1 (10.0)	4 (13.3)
	PTSD	1 (11.1)	0 (0)	2 (33.3)	1 (10.0)	4 (13.3)
	OCD	2 (22.2)	0 (0)	0 (0)	1 (10.0)	3 (10.0)
	Other	1 (11.1)	0 (0)	0 (0)	1 (10.0)	2 (6.7)
Vision	No	40 (66.7)	14 (77.8)	16 (88.9)	50 (83.3)	120 (76.9)
	Yes	20 (33.3)	4 (22.2)	2 (11.1)	10 (16.7)	36 (23.1)
Hearing	No	56 (93.3)	18 (100.0)	17 (97.4)	58 (96.7)	149 (95.5)
	Yes	4 (6.7)	0 (0.0)	1 (5.6)	2 (3.3)	7 (4.5)
Memory	No	58 (96.7)	17 (94.4)	17 (94.4)	59 (98.3)	151 (96.8)
	Yes	2 (3.3)	1 (5.6)	1 (5.6)	1 (1.7)	5 (3.2)

Abbreviations. MH = Mental Health, Dx = Diagnosis, Dep = Depression, Anx = Anxiety, PTSD = Posttraumatic Stress Disorder, OCD = Obsessive Compulsive Disorder.

State Anxiety

A 2(time: encoding, retrieval) x 4(dissociation group: LELR, LEHR, HELR, HEHR) mixed measures ANOVA for anxiety showed a significant main effect for time, $F(1, 152) = 43.08$, $p < .001$, $\eta_p^2 = .221$. Anxiety levels were elevated during encoding compared to retrieval. A main effect was also found between the groups, $F(3, 152) = 20.56$, $p < .001$, $\eta_p^2 = .289$. Post-hoc indicated the LELR group had significantly lower state anxiety than HEHR ($p < .001$), HELR ($p = .002$), LEHR ($p = .015$) groups. However, no significant interaction between time and group was found, $F(3, 152) = 1.68$, $p = .173$, $\eta_p^2 = .032$ (see Table 7).

Table 7
Descriptive Statistics for the Mean (M) and Standard Deviation (SD) for State Anxiety

	LELR *M (SD)*	LEHR *M (SD)*	HELR *M (SD)*	HEHR *M (SD)*	Total *M (SD)*
STAI - Encoding	12.38 (3.95)	15.00 (3.77)	16.44 (4.62)	17.52 (3.31)	15.13 (4.40)
STAI - Retrieval	10.87 (3.64)	13.44 (3.96)	13.00 (4.62)	15.08 (3.38)	13.03 (4.11)

Note. STAI = State-Trait Anxiety Inventory

Trait Measures

Multiple one-way ANOVAs were conducted between the dissociation groups and the trait measures of depression, anxiety, stress, dissociation and PTSD symptoms (Table 8).

A one-way between subjects ANOVA on the DES-II showed a significant main effect, $F(3, 152) = 9.45$, $p < .001$, $\eta_p^2 = .157$, where the only difference was the LELR group, which had lower trait dissociation compared to HEHR ($p < .001$). A similar effect was found for the DES-T, $F(3, 152) = 6.53$, $p < .001$, $\eta_p^2 = .114$, with lower pathological dissociation symptoms in LELR compared to HEHR ($p < .001$) group.

For the IES-6, a significant effect was evident, $F(3, 152) = 14.95$, $p < .001$, $\eta_p^2 = .228$, with the HEHR group having significantly more post-traumatic stress symptoms then HELR ($p = .009$), LEHR ($p = .006$) and LELR ($p < .001$) groups.

A main effect was also revealed for the DASS-21, $F(3, 152) = 4.20$, $p = .007$, $\eta_p^2 = .077$, where lower scores were evident in LELR compared to HELR ($p = .039$) and HEHR ($p = .016$) groups. All 3 subscales of the DASS-21 also showed significant effects. The depression subscale, $F(3, 152) = 2.93$, $p = .036$, $\eta_p^2 = .055$, produced higher scores in the LEHR group than the LELR group ($p = .034$). Anxiety was also significant, $F(3, 152) = 4.29$, $p = .006$, $\eta_p^2 = .078$, with post-hoc tests indicating that HELR had more anxiety than LELR ($p = .005$). The stress scale, $F(3, 152) = 3.85$, $p = .011$, $\eta_p^2 = .071$, showed more stress in the HEHR group than the LELR group ($p = .008$).

Table 8
Descriptive Statistics for the Mean (M) and Standard Deviations (SD) for Trait Measures

	LELR *M (SD)*	LEHR *M (SD)*	HELR *M (SD)*	HEHR *M (SD)*	Total *M (SD)*
DES-II	14.76 (12.70)	21.05 (10.28)	24.82 (14.98)	28.92 (17.46)	22.09 (15.92)
DES-T	8.44 (11.31)	13.06 (10.88)	13.89 (9.55)	19.62 (17.59)	13.91 (14.62)
IES-6	2.93 (2.33)	4.17 (3.28)	4.28 (3.82)	7.32 (4.66)	4.92 (4.12)
DASS	26.33(16.28)	36.11 (17.10)	40.33 (26.81)	37.30(21.11)	33.29 (20.32)
- Dep.	8.13 (7.71)	14.11 (9.83)	11.67 (9.13)	10.97 (8.10)	10.32 (8.44)
- Anx.	6.93 (5.38)	8.56 (7.51)	13.00 (8.55)	9.97 (7.39)	8.99 (7.06)
- Str.	11.27 (7.14)	13.44 (8.40)	15.67 (11.07)	16.97 (8.99)	13.99 (8.76)

Note. DES-II = Dissociative Experiences Scale-II; DES-T = Taxon Dissociative Experiences Scale-II Taxon; IES-6 = Impact of Events Scale – 6; DASS = Depression, Anxiety and Stress Scale-21; Dep., Anx., and Str. = Depression, Anxiety, and Stress subscales.

Validity Measures

One-way and mixed design ANOVA's were conducted on validity measures (See Table 9)**.** A 2(time: encoding, retrieval) x 4(group: LELR, LEHR, HELR, HEHR) mixed ANOVA for focus showed a main effect for time, $F(1, 152) = 11.72$, $p = .001$, $\eta_p^2 = .072$, with better focus at encoding compared to retrieval phase. A main effect was also found between the groups, $F(3, 152) = 6.02$, $p = .001$, $\eta_p^2 = .106$. The LELR group reported significantly more focus than HEHR ($p < .001$). There was not a significant interaction between time and group, $F(3, 152) = 0.98$, $p = .405$, $\eta_p^2 = .019$.

A 2(time: encoding, retrieval) x 4(group: LELR, LEHR, HELR, HEHR) mixed ANOVA for anxiousness while listening to and recalling the narrative showed a non-significant trend for time, $F(1, 152) = 3.88$, $p = .051$, $\eta_p^2 = .025$, with more anxiousness reported at encoding compared to retrieval. A main effect was found between groups, $F(3, 152) = 18.22$, $p < .001$, $\eta_p^2 = .264$ with LELR reporting less anxiousness than HELR ($p < .001$) and HEHR ($p < .001$) but no significant interaction between time and groups was found, $F(3, 152) = 1.03$, $p = .383$, $\eta_p^2 = .020$.

A one-way between subjects ANOVA across groups for understanding the narrative was significant, $F(3, 152) = 4.56$, $p = .004$, $\eta_p^2 = .083$, with the LELR group indicating a better understanding of the narrative than HELR ($p = .010$) and HEHR ($p = .036$) group.

When measuring how fragmented or disorganised participants thought their recollection was, a one-way ANOVA showed a significant result across groups, $F(3, 152) = 7.50$, $p < .001$, $\eta_p^2 = .129$, with HEHR ($p < .001$) and HELR ($p = .018$) indicating more fragmentation compared to the LELR group.

One-way ANOVA's measuring if participants have been thinking or talking about the story were conducted. Regarding thinking about the story no significant differences were found, $F(1, 152) = 1.39$, $p = .248$, $\eta_p^2 = .027$. However, participants with high dissociation during encoding were more likely to talk about the narrative with other people between sessions, $F(1, 154) = 5.23$, $p = .024$, $\eta_p^2 = .033$.

Table 9

Descriptive Statistics for the Mean (M) and Standard Deviations (SD) for Focus and Anxiousness

	LELR *M (SD)*	LEHR *M (SD)*	HELR *M (SD)*	HEHR *M (SD)*	Total *M (SD)*
Focus Encoding	8.08 (1.81)	6.50 (2.79)	6.72 (1.71)	6.45 (2.29)	7.12 (2.24)
Focus Retrieval	6.57 (2.65)	6.39 (2.89)	5.50 (2.75)	5.32 (2.80)	2.94 (2.78)
Anx. Encoding	3.23 (2.55)	4.72 (3.18)	6.44 (2.75)	6.33 (2.33)	4.97 (2.94)
Anx. Retrieval	3.22 (2.40)	4.50 (3.31)	5.32 (2.57)	5.73 (2.36)	4.58 (2.75)
Understanding	8.28 (2.42)	8.06 (2.39)	6.28 (2.37)	7.05 (2.48)	7.55 (2.52)
Fragmentation	5.33 (2.09)	5.94 (1.92)	6.89 (2.42)	6.97 (1.79)	6.21 (2.12)
Thinking	3.32 (2.24)	3.50 (2.43)	3.44 (2.31)	4.27 (3.79)	3.79 (2.29)
Talking	1.53 (1.94)	2.39 (2.52)	2.50 (2.48)	2.77 (2.59)	2.22 (2.38)

Note. Anx = Anxiousness

The analysis so far has shown that IES-6, DES, IES-6, focus, anxiousness, understanding, fragmentation, and talking have shown significant differences. Therefore, all following parametric statistics reported below were re-run with these factors as covariates. The ANCOVA results showed no difference to the ANOVA results reported below, so the covariates were not influential on dependent variables. See Appendix S for a comparison of ANOVA and ANCOVA results.

Intrusion Diary Analysis

Hypothesis Two: Increased Frequency and Distress of Intrusions with Increased Dissociation

A Mann-Whitney U test (see Table 10) was used to investigate results for the frequencies of intrusions due to the number of outliers in the high dissociation group. Results showed significantly more intrusions for high versus low dissociation groups for day one (U = 2305, p = .013), Day two (U = 2334, p = .018) and day three (U = 2445, p = .035).

Table 10
Mann-Whitney Results for Mean Rank, Mean, Standard Deviation and Z-Values for Frequency of Intrusions across Dissociation Groups at Encoding

	Low Dissociation		High Dissociation		*Z-Value*
	Mean Rank	*M (SD)*	*Mean Rank*	*M (SD)*	
Frequency Day 1	68.73	1.23 (1.18)	85.83	1.62 (1.12)	-2.48
Frequency Day 2	69.12	1.01 (1.06)	85.46	1.41 (1.12)	-2.37
Frequency Day 3	70.60	0.47 (0.72)	84.05	0.66 (0.72)	-2.11

Only 56 out of the 156 participants reported distress in the intrusion diary (LE = 19; HE = 37). A 3(time: day 1, day 2, day 3) x 2(dissociation group at encoding: low, high) ANOVA for distress of intrusions revealed no main effects of time, $F(1.84, 99.12) = 2.77$, $p = .072$, $\eta_p^2 = .049$ or dissociation group, $F(1, 54) = 0.91$, $p = .346$, $\eta_p^2 = .016$. There was no interaction between time and dissociation group, $F\ (1.84, 99.12) = 0.76$, $p = .459$, $\eta_p^2 = .014$ (Table 11).

Table 11
Descriptive Statistics for Mean (M) and Standard Deviations (SD) for Distress across Dissociation Groups at Encoding

	Low Dissociation *M (SD)*	High Dissociation *M (SD)*	Total *M (SD)*
Distress Day 1	2.97 (1.74)	3.07 (1.46)	3.03 (1.54)
Distress Day 2	2.33 (1.91)	3.02 (1.77)	2.79 (1.83)
Distress Day 3	2.29 (1.92)	2.64 (1.63)	2.52 (1.73)

Hypothesis two was partially supported with more frequent intrusions for high than low peri-experimental dissociation. However, part two of this hypothesis was not supported, with no differences in distress evident between groups.

Narrative Analysis

Hypothesis Three: Narrative Details will be Affected by Dissociation

One-way ANOVA's for categories coded within the narrative were conducted across dissociation groups. No significant differences were found between the groups for any category variable: fragmentation, $F(3, 152) = 0.32$, $p = .812$, $\eta_p^2 = .006$, disorganisation, $F(3, 152) = 1.10$, $p = .351$, $\eta_p^2 = .021$, organisation, $F(3, 152) = 0.83$, $p = .480$, $\eta_p^2 = .016$, elaboration, $F(3, 152) = 1.41$, $p = .243$, $\eta_p^2 = .027$, omission, $F(3, 152) = 0.56$, $p = .645$, $\eta_p^2 = .011$, internal events, $F(3, 152) = 0.43$, $p = .734$, $\eta_p^2 = .008$, external events, $F(3, 152) = 1.64$, $p = .182$, $\eta_p^2 = .031$, or death omission, $F(3, 152) = 1.71$, $p = .167$, $\eta_p^2 = .033$ (Table 12). Hypothesis three was therefore, not supported; there was not greater fragmentation nor less organisation in the high dissociation group compared with the low dissociation group.

Table 12
Descriptive Statistics for Mean (M) and Standard Deviations (SD) for the Categories by Dissociation Groups

	LELR M (SD)	LEHR M (SD)	HELR M (SD)	HEHR M (SD)	Total M (SD)
Fragmentation	9.68 (5.19)	10.05 (4.69)	8.84 (5.48)	10.19 (5.66)	9.82 (5.32)
Disorganisation	10.82 (7.83)	13.39 (8.28)	13.61 (9.42)	13.00 (7.78)	12.28 (8.06)
Organisation	6.04 (4.72)	6.55 (4.79)	5.50 (6.08)	4.93 (4.18)	5.61 (4.70)
Elaboration	7.98 (5.48)	6.17 (3.38)	9.89 (4.98)	7.98 (5.98)	7.99 (5.46)
Omission	1.69 (2.27)	2.18 (2.42)	1.70 (1.52)	1.46 (1.97)	1.66 (2.10)
Internal Events	21.23 (9.06)	23.48 (8.73)	23.11 (10.40)	22.18 (7.95)	22.07 (8.73)
External Events	64.63 (11.43)	62.41 (9.05)	58.92 (15.05)	62.50 (10.92)	62.80 (11.12)
Death Omission	0.60 (0.89)	0.83 (0.99)	1.22 (1.43)	0.76 (1.09)	0.76 (1.06)

Narrative Length and Coherence

Hypothesis Four: Narrative Length, Perception/Conception Scores and Coherence are Affected by Dissociation Levels

A one-way ANOVA for the number of details remembered, to measure length, was conducted across the dissociation groups. No significant differences were found, $F(3, 152) = 0.67$, p

= .570, η_p^2 = .013, with the low dissociation group not reporting greater narrative details than the high dissociation group. Similarly, the level of perceptual/conceptual processing in the narrative recall showed no significant difference, F (3, 152) = 0.85, p = .468, η_p^2 = .017 (See Table 13).

Table 13
Descriptive Statistics for Mean (M) and Standard Deviations (SD) for Length and Conceptual/Perceptual (Concept/Percept) Rating Scores by Dissociation Groups

	LELR *M (SD)*	LEHR *M (SD)*	HELR *M (SD)*	HEHR *M (SD)*	Total *M (SD)*
Length	28.78 (11.48)	30.28 (14.90)	24.67 (12.14)	29.75 (16.53)	28.85 (14.04)
Concept/Percept	7.80 (0.54)	7.78 (0.63)	7.88 (0.56)	7.94 (0.50)	7.86 (0.54)

A Kruskal-Wallis H test showed no statistically significant difference in coherence scores across dissociation groups, $\chi^2(3) = 4.948$, p = .176 (see Table 14).

Table 14
Descriptive Statistics for Coherence by Dissociation Groups Displaying the Mean Rank

	LELR Mean Rank	LEHR Mean Rank	HELR Mean Rank	HEHR Mean Rank
Coherence*	69.19	83.11	84.83	84.53

* The median for all four groups = 2.

Given that there were no significant differences in the narrative framework, hypothesis four was not supported.

Priming Measures

Hypothesis Five: Priming Measures are Affected by Dissociation

A 3(word-type: Target Threat, Non-Target Threat, Target Neutral) x 2(dissociation group at encoding: Low, High) ANOVA for the word stem completion task revealed a significant main effect of word-type, F(1.98, 304.14) = 134.34, p < .001, η_p^2 = .466. A paired sample t-test indicated that the target neutral words showed more perceptual priming than the target threat and non-target threat words, while the target threat words showed less priming than the target neutral and non-target threat words (all p's < .001).

No main effect was found for dissociation group, $F(1, 54) = 0.01$, $p = .947$, $\eta_p^2 < .001$. There was no interaction between word-type and dissociation group, $F(1.98, 304.14) = 0.67$, $p = .512$, $\eta_p^2 = .004$. Therefore, no dissociation effect on perceptual priming was found.

A 3(word-type: Target Threat, Non-Target Threat, Target Neutral) x 2(dissociation group at encoding: Low, High) ANOVA for the word-cue association task produced a significant main effect of word-type, $F(1.98, 304.14) = 83.32$, $p < .001$, $\eta_p^2 = .351$. A paired sample t-test indicated that the target neutral words showed less conceptual priming than the target threat and non-target threat words, while the target threat words showed more priming than the target neutral and non-target threat words (all p's < .001).

No main effect was found for dissociation, $F(1, 154) = 0.35$, $p = .555$, $\eta_p^2 = .002$, and no interaction between word-type and dissociation group, $F(1.98, 304.14) = 0.65$, $p = .835$, $\eta_p^2 = .005$. With no dissociation effect on perceptual or conceptual priming, hypothesis five was not supported.

Table 15
*Descriptive Statistics for Mean (M) and Standard Deviations (SD) for the W*ord-Cue Association Task (WAT) and *W*ord Stem Completion Task (WST) for *Word-Type and Dissociation Group at Encoding*

	Word Type	LE M (SD)	HE M (SD)	Total M (SD)
WST	Target Threat	0.42 (0.67)	0.33 (0.47)	0.38 (0.58)
	Non-Target Threat	0.73 (0.61)	0.76 (0.61)	0.74 (0.61)
	Target Neutral	1.34 (0.58)	1.43 (0.64)	1.39 (0.61)
WAT	Target Threat	1.74 (1.01)	1.81 (0.89)	1.78 (0.95)
	Non-Target Threat	1.26 (1.05)	1.20 (0.99)	1.23 (1.02)
	Target Neutral	0.59 (0.84)	0.41 (0.74)	0.50 (0.79)

Discussion

The current study aimed to examine the role of peri-experimental dissociation during encoding and retrieval following an analogue traumatic narrative using an audio-only version of the Trauma Film Paradigm. Perceptual and conceptual processing, as well as intrusions and narrative

memory, were explored. Initially, this study aimed to improve upon the procedure of Downs-Woolley (2019) by examining if dissociation could be produced through a modernised spinning dot task and whether dissociation could be eliminated in the picture group. This was successfully achieved in the baseline condition, suggesting that the spinning dot effectively induced dissociation. However, upon introducing the analogue trauma narrative, these differences were eliminated. Therefore, spontaneous dissociation while listening to and recalling the narrative was used to further investigate the effects of dissociation on processing and analogue post-traumatic symptomology.

A secondary aim of the study was to investigate how peritraumatic dissociation affects posttraumatic symptomology. The high spontaneous dissociation group reported more frequent intrusions, but the groups did not differ in the level of intrusion distress. The narrative's memory rendered no support for the proposed hypotheses regarding narrative details, length, or coherence, with dissociation groups showing no differences in their metrics. The two priming measures showed no difference across dissociation groups; however, somewhat surprisingly, the neutral words showed more perceptual priming, while trauma-related words showed more conceptual priming.

All findings are discussed in depth below regarding the individual hypotheses, followed by limitations, future research suggestions and a conclusion.

Dissociation Manipulation

Hypothesis one suggested that the modified spinning dot would induce more dissociation than the picture and control tasks. Results indicate that the induction was successful during the baseline. The spinning dot task was inducing significantly more dissociation than the picture and the control task, as previously found by Dorahy et al. (2016) and Lickel et al. (2008). The results suggest that in the absence of any other task, the moderated spinning dot is an effective tool to induce dissociation in an experimental setting. Hypothesis one is therefore partially supported.

Interestingly, however, once the narrative was added to the conditions at the encoding phase, the results no longer revealed a difference. Although the control condition was unaffected, dissociation was reduced in the spinning dot condition and increased in the picture condition. This lack of differences between groups was evident at both the encoding and retrieval stages. Seemingly, adding the narrative disrupts the dissociation induction. Therefore, it seems the story captured a degree of attention in those watching the spinning dot, such that it blocked the spinning dot's ability to induce detachment to a certain degree. This might suggest the narrative itself was capable of inducing some degree of detachment.

Krans et al. (2010) reported that purely listening to a narrative of a traumatic event induced posttraumatic symptoms, which indicates that an auditory narrative can induce secondary trauma responses and potentially peritraumatic dissociation. The introduction of the narrative could, therefore, lead to an increase in dissociation. However, the results of the current study indicate a non-significant increase in the control group. This questions whether the narrative itself was for increased dissociation in the picture condition. A potential explanation for this could be the divided attentional nature of the condition, similar to explaining why the spinning dot may have produced less dissociation when the narrative was included. Here, a singular attentional focus on the spinning dot in the baseline condition was reduced when the narrative was added. This meant there was less attention on the spinning dot stimuli that induced detachment. In the picture condition, having attention divided between a non-dissociative picture task and listening to a distressing narrative seemed to reduce the task's attentional load that was not facilitating detachment. Therefore, focussing some attentional load on a distressing narrative, potentially bolstering detachment in this condition.

Another subtlety different potential explanation based on the effect of dual processing (i.e., the splitting of attention on a visual and an auditory task simultaneously) during the narrative phase

of the experiment, focusses on task difficulty associated with increased interference (Fougnie et al., 2018). Arguably, task difficulty was much greater for the spinning dot, which requires high levels of conscious attention for continued focus, than for the picture and control conditions. Therefore, the introduction of the narrative potentially allowed participants to drop the intensity of focus on the spinning dot and direct some focus on the narrative, reducing the intense load and potentially detachment. On the other hand, the low-level intensity of focus for viewing pictures may have increased with the narrative, potentially increasing detachment. These possibilities require further empirical investigation.

Lastly, the findings may be the result of the images chosen for the study. In retrospect, the picture group's images had a neutral rating regarding the range of valence and arousal, indicating a neutral affect. However, the images included some depictions of people and faces. While faces generally can be rated as neutral, research suggests that even neutral images of faces can evoke emotional responses (Carvajal et al., 2013). According to Carvajal et al. (2013), different emotions can be attributed to neutral faces depending on the emotional valance of the task a participant is performing. This would suggest that a neutral face could evoke a negative emotion while listening to a traumatic narrative. Informal feedback indicated that some participants felt that the pictures of the people worked well with the narrative. The negative emotions invoked by the traumatic narrative may be supported by the inclusion of neutral pictures that have been assigned negative emotions by the participant. The inclusion of such pictures is likely to produce a higher focus on the narrative itself because of the link to the narrative made by the participants. Therefore dissociation could have been increased through a more intense traumatic narrative (Krans et al., 2010) or potentially increased detachment (Holmes et al., 2005). Negative emotions are a significant predictor of post-traumatic symptoms (Goutaudie et al., 2012). Negative emotions could explain the picture task group's increase of dissociation from the images in combination with the trauma story, leading to

dissociation increases. The effect of affect through the use of images in control conditions needs further exploration, and excluding images, including people, might be indicated for future research.

Intrusion Diaries

As proposed in hypothesis two, the intrusion diary aimed to find an increase in intrusions' frequencies and distress. This study demonstrated that spontaneous dissociation could increase intrusions after listening to an analogue traumatic narrative, which is consistent with previous experimental research (Sündermann et al., 2013). Importantly, these results were consistent over all three days when comparing the groups, which provides additional support for the hypothesis that dissociation increases the frequency of intrusions. This highlights that spontaneous dissociation in analogue trauma settings can lead to increased frequent intrusions. Future research avenues could use analogue studies and provide further insight into frequencies of intrusions and potential treatment options.

However, the results show no significant results for distress over time or between groups. The literature also provides an inconsistent picture of the effect of the distress of intrusions. For example, Dorahy et al. (2016) and Michael et al. (2005) reported an increase in intrusion distress following increased dissociation, while Holmes et al. (2004) and Krans et al. (2010) report no influence of dissociation on distressing intrusions. The current study used auditory stimuli in the form of a narrative, similar to Krans et al. (2010), who used an audio version of the TFP to investigate potential visual intrusion from an auditory narrative. They found no difference in intrusion distress between groups who exclusively listened to the story or performed parallel visuospatial or auditory tasks. This suggests that listening to a narrative by itself might not be enough to induce distress in the intrusions. Seemingly, more work is needed to understand the association between dissociation and the nature of intrusion distress.

Dual attention may also explain why the narrative did not increase distress. Adding visual stimuli to the auditory narrative, which is not related to the narrative itself, may have caused less focus on the emotional details and prevented the processing of the narrative. Consistent with our results, previous work has failed to produce distressing intrusions through analogue trauma (Brewin & Saunders, 2001; E. A. Holmes & C. Bourne, 2008; Holmes et al., 2004). Considering that intrusions are a hallmark of PTSD (American Psychiatric Association, 2013), one of the factors reducing distress in analogue studies may be the limited intensity of distress. Despite the best efforts, the trauma induced by the analogue trauma narrative may not be capable of mimicking real-life distress found in autobiographical studies or purely clinical populations.

Narrative Details

The effects on narrative details as proposed by hypothesis three were not supported. They failed to replicate findings of Foa et al. (1995) and Filkukova et al. (2016) who reported that dissociation during processing significantly effects narrative details such as actions, dialogue and organisation. In the current study, all narrative details failed to render significant results across high and low spontaneous dissociation groups. These findings are similar to those by Downs-Woolley (2019) who only found significant differences in the omission category in her third study when using a shortened trauma narrative. However, the use of a more extended version in her second study produced significant differences in disorganisation, fragmentation, and external events. The length of the narrative may have changed the outcome of the categories as indicated by Krans et al. (2010), who suggested that the narrative's length may affect fragmentation and organisation. This study used the same shortened narrative as Downs-Woolley (2019) in her third study.

The addition of the new category, death omission did not reveal any significant differences between groups. Due to the nature of the category, death omission was only recorded in the last segment of six segments – the narrator's death. Similar measures could have been created for each

segment of the narrative. Relevant events of a segment's storyline (e.g. abduction in segment one or waterboarding for another segment), could be used to measure more omission and commission throughout the narrative. Commissions, such as pseudo memories, were partially covered in the categories ‘elaboration’ (Items which were not mentioned in the narrative) and ‘incorrect fact’ (items mentioned but remembered wrong) yet no commission category investigated commission errors overall. Further investigation into a commission category, which purely focuses on pseudo-memories could reveal more insight into creating genuine and counterfeit memories, their frequencies, and causes.

Narrative Length, Coherence and Perceptual/Conceptual Results

The results of the present study did not support hypothesis four. There were no significant differences in length, coherence or perceptual/conceptual processing scores between dissociation groups. Previous research by Murray et al. (2002) suggested that length and coherence are influenced by dissociation, but this was not replicated in the current study. Two possible explanations could account for this outcome. Once again, the narrative's length may be responsible, expecting less material to be remembered, but another cause could be due to a rehearsal effect. The high dissociation group reported talking about the narrative significantly more than the low dissociation group at encoding. Therefore, the repeated or more regular communication with others about the narrative could lead to more elaborate processing than if the high dissociation group talked about it to the same degree as the low dissociation group.

Contrary to previous research (Buck et al., 2006), the perception/conception category, as a measure in the narrative, did not find significant results. This may again be related to the length of the narrative or connected to the narrative's analogue nature. While the narrative was distressing, it may not necessarily have been as relevant to the participants as an autobiographical experience, even though some participants reported dissociation while listening to it. Therefore, the threat

involved in the audio narrative might not have been severe enough for dissociation to impact on adequate processing genuinely. In addition, perception/conception as a category has not been widely used in analogue research and is generally used in autobiographical, retrospective trauma memory. Future studies should investigate more potent experimental analogue trauma measures in different settings.

Perceptual and Conceptual Priming

The results for the priming tasks, according to hypothesis five, indicated no difference for either perceptual or conceptual priming between groups, and was therefore not supported. Previous research has shown varying results. While Lyttle et al. (2010) reported successfully perceptual and conceptual priming results, Dorahy et al. (2016) were successful with perceptual priming, the conceptual priming task, however, did not reveal any differences. In this study, the reasonably low incidence of participants recalling the expected target words (hit rate) overall may have influenced the outcome of the priming tasks. Low hit rates limit the statistical ability to reveal differences between groups. Additionally, with words having to be related to the narrative and have the right frequency to be included, creates further limits to the availability for target word choices. Furthermore, Lyttle et al. (2010) reported on a clinical sample which may explain differences in the results.

While no differences between groups were found, an unexpected significant difference between threat and neutral words was evident in both priming tasks irrespective of the group. Contrary to previous research (Lyttle et al., 2010; Michael et al., 2005), which reported an increase in perceptual priming for trauma words, the present study revealed that neutral target words elicited more perceptual priming, while trauma targets related to the narrative were the least primed. Given a well-educated university sample were used, it seems that trauma words attracted less perceptual processing that neutral words. This would be expected in groups who do not avoid processing. This

idea is supported by conceptual findings where trauma has had more conceptual processing than neutral words. These findings contrast to previous work by Lyttle et al. (2010). They are supported by Dorahy et al. (2016) who also reported more conceptual priming with threat words in an analogue study with student groups. Using an analogue narrative may not pose the same threat and emotional association.

Strength and Limitations

A strength of this study was the use of the spinning dot modification, which was very similar to the spinning dot successfully used by Dorahy et al. (2016). This modified spinning dot was shown to successfully induce dissociation in a non-clinical sample of participants, which further supports the use of this paradigm in future research. Additionally, the analogue setting, which has the advantage of controlling for factors such as identical stories to compare memory retrieval was a significant strength of this study. This provided an ethically sound path for exploring trauma and its repercussions in a safe environment. The advantage of analogue research is also the ability to present more extensive samples for optimal comparison. The sample size of 156 participants allowed for the analyses of multiple factors, which can use dissociation to provide a well-controlled, laboratory-based study.

However, despite these strengths, some limitations need consideration. While the analogue design provides many advantages, it is limited in that analogue studies are less effective in producing trauma responses than real-life events (Marks et al., 2018) and often fail to induce the same results (Brewin & Saunders, 2001; Holmes et al., 2004). While personal trauma memories are emotionally routed, analogue trauma is essentially a memorised event that does not necessarily affect a participant personally.

Self-report measures might also be a limitation in this study. While there is no alternate way at present to measure concepts like peri-traumatic dissociation, it is well-established that self-report

measures are heavily reliant on the perception and interpretation of an individual's circumstances and emotions. The potential self-induced pressure to please or meet expectations of an experiment can alter responses. Especially in analogue settings, measures such as the PDEQ are often adjusted with questions changed, omitted or added, to produce a suitable assessment for the setting. Questions such as "I found I was on autopilot – I ended up doing things I later realized I hadn't actively decided to do" are not feasible in a setting where a participant is sitting at a desk watching a screen. This makes consistent use of the measure and comparison between studies difficult.

The current sample is a limitation to the present study. The use of a non-clinical pool of participants, who are predominantly female, young and receiving university-level education, though prominent in research, is not representative of society as a whole. Not only does this limit the generalisability of the findings, it presents a potentially confounding factor, whereby a tertiary education may be a protective factor for PTSD symptomology (Engelhard et al., 2003; Sopp et al., 2020). While using a convenience sample of university students provided a large number of participants, future research could benefit from using a more diverse range of participants.

A variety of avenues for future research are possible. Future research should investigate analogue options with different visual stimuli, such as the mirror starring task, which is less intense. This may eliminate the dual attention issues, especially since it was successful in previous analogue audio-only studies (Dorahy et al., 2016). Another avenue could be the use of a more relatable story. Greater identification with the narrator may result in clearer peritraumatic dissociation, such as the motor vehicle accident by a university student used by Candel et al. (2003). A neutral control narrative may also be useful in comparison, especially to compare peritraumatic dissociation. Therefore, results can be evaluated as caused by the narrative or the task effects thereof.

Conclusion

The present study aimed to utilise the audio version of the TFP alongside visual stimuli to induce dissociation and analyse the effect of peritraumatic dissociation on trauma memory at the encoding and retrieval stages. While the visual stimuli were successful at baseline, the stimuli did not produce dissociation as expected after introducing the narrative.

Hypothesis one was supported, and the spinning dot manipulation successfully induced dissociation. Therefore the future use of similar dissociation techniques in experimental settings is supported. The other hypotheses were not supported as expected, although intrusion frequencies were elevated as predicted. The priming tasks did not reveal any results differing across groups divided by spontaneous dissociation. However, the reaction to trauma and neutral words was unexpected and might reflect the non-clinical sample used. While the present study results were not as expected, this study provides a variety of avenues for future research.

References

American Psychiatric Association. (1980). *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed.).

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.). https://doi.org/https://doi.org/10.1176/appi.books.9780890425596

Ball, S. C., & Brewin, C. R. (2012). The effect of rumination on intrusive images and mood: An experimental investigation using the trauma film paradigm. *Journal of Experimental Psychopathology, 3*(2), 297-309. https://doi.org/https://doi.org/10.5127/jep.019511

Bedard-Gilligan, M., & Zoellner, L. A. (2012). Dissociation and memory fragmentation in post-traumatic stress disorder: An evaluation of the dissociative encoding hypothesis. *Memory, 20*(3), 277-299. https://doi.org/10.1080/09658211.2012.655747

Bedard-Gilligan, M., Zoellner, L. A., & Feeny, N. C. (2017). Is trauma memory special? Trauma narrative fragmentation in PTSD: Effects of treatment and response. *Clinical Psychological Science, 5*(2), 212-225. https://doi.org/https://doi.org/10.1177/2167702616676581

Brewin, C. R. (2014). Episodic memory, perceptual memory, and their interaction: foundations for a theory of posttraumatic stress disorder. *Psychological Bulletin, 140*(1), 69. https://doi.org/https://doi.org/10.1037/a0033722

Brewin, C. R., Dalgleish, T., & Joseph, S. (1996). A dual representation theory of posttraumatic stress disorder. *Psychological Review, 103*(4), 670. https://doi.org/10.1037/0033-295x.103.4.670

Brewin, C. R., Gregory, J. D., Lipton, M., & Burgess, N. (2010). Intrusive images in psychological disorders: characteristics, neural mechanisms, and treatment implications. *Psychological Review, 117*(1), 210. https://doi.org/https://doi.org/10.1037/a0018113

Brewin, C. R., & Saunders, J. (2001, Dec). The effect of dissociation at encoding on intrusive memories for a stressful film. *British Journal of Medical Psychology, 74*(Pt 4), 467-472. https://doi.org/https://doi.org/10.1348/000711201161118

Brown, R. J. (2006). Different types of "dissociation" have different psychological mechanisms. *Journal of Trauma & Dissociation, 7*(4), 7-28. https://doi.org/ https://doi.org/10.4324/9781439804384-2

Buck, N., Kindt, M., Van Den Hout, M., Steens, L., & Linders, C. (2006). Perceptual memory representations and memory fragmentation as predictors of post-trauma symptoms. *Behavioural and Cognitive Psychotherapy, 35*(3), 259-272. https://doi.org/https://doi.org/10.1017/s1352465806003468

Burgess, A. W., & Holmstrom, L. L. (1974). Rape trauma syndrome. *American Journal of Psychiatry, 131*(9), 981-986. https://doi.org/https://doi.org/10.1176/ajp.131.9.981

Callimachi, R. (2014). The Horror Before the Beheadings. *New York Times*. https://www.nytimes.com/2014/10/26/world/middleeast/horror-before-the-beheadings-what-isis-hostages-endured-in-syria.html

Candel, I., Merckelbach, H., & Kuijpers, M. (2003, 2003/06/01/). Dissociative experiences are related to commissions in emotional memory. *Behaviour Research and Therapy, 41*(6), 719-725. https://doi.org/https://doi.org/10.1016/S0005-7967(03)00016-0

Cardena, E., & Spiegel, D. (1993, Mar). Dissociative reactions to the San Francisco Bay Area earthquake of 1989. *American Journal of Psychiatry, 150*(3), 474-478. https://doi.org/https://doi.org/10.1176/ajp.150.3.474

Carlson, E. B., & Putnam, F. W. (1993). An update on the dissociative experiences scale. *Dissociation: progress in the dissociative disorders*.

Carvajal, F., Rubio, S., Serrano, J. M., Ríos-Lago, M., Alvarez-Linera, J., Pacheco, L., & Martín, P. (2013). Is a neutral expression also a neutral stimulus? A study with functional magnetic resonance. *Experimental Brain Research, 228*(4), 467-479. https://doi.org/https://doi.org/10.1007/s00221-013-3578-1

Conway, M. A., & Pleydell-Pearce, C. W. (2000). The construction of autobiographical memories in the self-memory system. *Psychological Review, 107*(2), 261. https://doi.org/https://doi.org/10.1037/0033-295x.107.2.261

Crespo, M., & Fernández-Lansac, V. (2016). Memory and narrative of traumatic events: A literature review. *Psychological Trauma: Theory, Research, Practice, and Policy, 8*(2), 149. https://doi.org/https://doi.org/10.1037/tra0000041

Dalenberg, C. J., Brand, B. L., Gleaves, D. H., Dorahy, M. J., Loewenstein, R. J., Cardeña, E., Frewen, P. A., Carlson, E. B., & Spiegel, D. (2012). Evaluation of the evidence for the trauma and fantasy models of dissociation. *Psychological Bulletin, 138*(3), 550-588. https://doi.org/10.1037/a0027447

Dorahy, M. J., Peck, R. K., & Huntjens, R. J. C. (2016, 2016/08/07). The impact of dissociation on perceptual priming and intrusions after listening to auditory narratives. *Journal of Trauma & Dissociation, 17*(4), 410-425. https://doi.org/10.1080/15299732.2015.1134746

Downs-Woolley, M. (2019). *The Role of Dissociation on the Encoding, Processing and Retrieval of Emotional Information: An Analogue Investigation with Implications for PTSD* [Unpublished doctoral thesis, University of Canterbury, Christchurch, New Zealand,

Ehlers, A. (2010). Understanding and Treating Unwanted Trauma Memories in Posttraumatic Stress Disorder. *Zeitschrift für Psychologie / Journal of Psychology, 218*(2), 141-145. https://doi.org/10.1027/0044-3409/a000021

Ehlers, A., & Clark, D. M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy, 38*(4), 319-345. https://doi.org/https://doi.org/10.1016/s0005-7967(99)00123-0

Ehlers, A., Mayou, R. A., & Bryant, B. (1998). Psychological predictors of chronic posttraumatic stress disorder after motor vehicle accidents. *Journal of Abnormal Psychology, 107*(3), 508. https://doi.org/https://doi.org/10.1037/0021-843x.107.3.508

Engelhard, I. M., Van Den Hout, M. A., Kindt, M., Arntz, A., & Schouten, E. (2003). Peritraumatic dissociation and posttraumatic stress after pregnancy loss: A prospective study. *Behaviour Research and Therapy, 41*(1), 67-78. https://doi.org/10.1016/S0005-7967(01)00130-9

Evans, C., Ehlers, A., Mezey, G., & Clark, D. M. (2007). Intrusive memories in perpetrators of violent crime: Emotions and cognitions. *Journal of consulting and clinical psychology, 75*(1), 134-144. https://doi.org/10.1037/0022-006X.75.1.134

Faulkner, G. J. (2019). *The role of dissociation, conceptual processing and PTSD symptoms in analogue distressing narratives* [Unpublished masters thesis, University of Canterbury, Christchurch, New Zealand,

Filkukova, P., Jensen, T. K., Sofie Hafstad, G., Torvund Minde, H., & Dyb, G. (2016). The relationship between posttraumatic stress symptoms and narrative structure among adolescent terrorist-attack survivors. *European Journal of Psychotraumatology, 7*(1), 29551. https://doi.org/https://doi.org/10.3402/ejpt.v7.29551

Foa, E. B., Molnar, C., & Cashman, L. (1995). Change in rape narratives during exposure therapy for posttraumatic stress disorder. *Journal of Traumatic Stress, 8*(4), 675-690. https://doi.org/https://doi.org/10.1002/jts.2490080409

Fougnie, D., Cockhren, J., & Marois, R. (2018). A common source of attention for auditory and visual tracking. *Attention, Perception, & Psychophysics, 80*(6), 1571-1583. https://doi.org/https://doi.org/10.3758/s13414-018-1524-9

Giesbrecht, T., Geraerts, E., & Merckelbach, H. (2007). Dissociation, memory commission errors, and heightened autonomic reactivity. *Psychiatry Research, 150*(3), 277-285. https://doi.org/https://doi.org/10.1016/j.psychres.2006.04.016

Golier, J. A., Yehuda, R., Lupien, S. J., & Harvey, P. D. (2003). Memory for trauma-related information in Holocaust survivors with PTSD. *Psychiatry Research, 121*(2), 133-143. https://doi.org/https://doi.org/10.1016/S0925-4927(03)00120-3

Hagenaars, M. A., & Krans, J. (2011). Trait and state dissociation in the prediction of intrusive images. *International Journal of Cognitive Therapy, 4*(2), 145-153. https://doi.org/https://doi.org/10.1521/ijct.2011.4.2.145

Halligan, S. L., Clark, D. M., & Ehlers, A. (2002). Cognitive processing, memory, and the development of PTSD symptoms: two experimental analogue studies. *Journal of Behavior Therapy and Experimental Psychiatry, 33*(2), 73-89. https://doi.org/doi:10.1016/S0005-7916(02)00014-9

Halligan, S. L., Michael, T., Clark, D. M., & Ehlers, A. (2003, Jun). Posttraumatic stress disorder following assault: the role of cognitive processing, trauma memory, and appraisals. *J Consult Clin Psychol*, *71*(3), 419-431. https://doi.org/10.1037/0022-006x.71.3.419

Harvey, A. G., & Bryant, R. A. (1999). A qualitative investigation of the organization of traumatic memories. *British Journal of Clinical Psychology*, *38*(4), 401-405. https://doi.org/10.1348/014466599162999

Holmes, E. A., & Bourne, C. (2008). Inducing and modulating intrusive emotional memories: A review of the trauma film paradigm. *Acta Psychologica*, *127*(3), 553-566. https://doi.org/https://doi.org/10.1016/j.actpsy.2007.11.002

Holmes, E. A., & Bourne, C. (2008, Mar). Inducing and modulating intrusive emotional memories: a review of the trauma film paradigm. *Acta Psychologica*, *127*(3), 553-566. https://doi.org/https://dx.doi.org/10.1016/j.actpsy.2007.11.002

Holmes, E. A., Brewin, C. R., & Hennessy, R. G. (2004). Trauma Films, Information Processing, and Intrusive Memory Development. *Journal of Experimental Psychology: General*, *133*(1), 3-22. https://doi.org/10.1037/0096-3445.133.1.3

Holmes, E. A., Brown, R. J., Mansell, W., Fearon, R. P., Hunter, E. C., Frasquilho, F., & Oakley, D. A. (2005). Are there two qualitatively distinct forms of dissociation? A review and some clinical implications. *Clinical Psychology Review*, *25*(1), 1-23. https://doi.org/doi:10.1016/j.cpr.2004.08.006

Huntjens, R. J., Dorahy, M. J., & van Wees-Cieraad, R. (2013). Dissociation and memory fragmentation. *Cognitive behavioural approaches to the understanding and treatment of dissociation*, 92-103.

James, E. L., Lau-Zhu, A., Clark, I. A., Visser, R. M., Hagenaars, M. A., & Holmes, E. A. (2016). The trauma film paradigm as an experimental psychopathology model of psychological trauma: Intrusive memories and beyond. *Clinical Psychology Review, 47*, 106-142. https://doi.org/https://doi.org/10.1016/j.cpr.2016.04.010

Jelinek, L., Hottenrott, B., Randjbar, S., Peters, M. J., & Moritz, S. (2009). Visual false memories in post-traumatic stress disorder (PTSD). *Journal of Behavior Therapy and Experimental Psychiatry, 40*(2), 374-383. https://doi.org/10.1016/j.jbtep.2009.02.003

Kindt, M., & van den Hout, M. (2003). Dissociation and memory fragmentation: Experimental effects on meta-memory but not on actual memory performance. *Behaviour Research and Therapy, 41*(2), 167-178. https://doi.org/doi: 10.1016/S0005-7967(01)00135-8

Krans, J., Näring, G., Holmes, E. A., & Becker, E. S. (2010). "I see what you're saying": Intrusive images from listening to a traumatic verbal report. *Journal of Anxiety Disorders, 24*(1), 134-140. https://doi.org/doi: 10.1016/j.janxdis.2009.09.009

Lang, P., Bradley, M., & Cuthbert, B. (2008). *International affective picture system (IAPS): affective ratings of pictures and instruction manual. Technical Report A-8* University of Florida, Gainesville.

Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (1999). *International affective picture system (IAPS): Instruction manual and affective ratings*. University of Florida, Gainesville, FL.

Leonard, K. N., Telch, M. J., & Harrington, P. J. (1999). Dissociation in the laboratory: A comparison of strategies. *Behaviour Research and Therapy, 37*(1), 49-61. https://doi.org/doi:10.1016/S0005-7967(98)00072-2

Lickel, J., Nelson, E., Lickel, A. H., & Deacon, B. (2008). Interoceptive exposure exercises for evoking depersonalization and derealization: A pilot study. *Journal of Cognitive Psychotherapy*, *22*(4), 321-330. https://doi.org/doi: 10.1891/0889-8391.22.4.321

Lovibond, S. H., & Lovibond, P. F. (1996). *Manual for the depression anxiety stress scales*. Psychology Foundation of Australia.

Lyttle, N., Dorahy, M. J., Hanna, D., & Huntjens, R. J. C. (2010). Conceptual and perceptual priming and dissociation in chronic posttraumatic stress disorder. *Journal of Abnormal Psychology*, *119*(4), 777-790. https://doi.org/10.1037/a0020894

Marks, E. H., Franklin, A. R., & Zoellner, L. A. (2018). Can't get it out of my mind: A systematic review of predictors of intrusive memories of distressing events. *Psychological Bulletin*, *144*(6), 584-640. https://doi.org/10.1037/bul0000132

Marmar, C. R., Weiss, D. S., & Metzler, T. J. (1997). The Peritraumatic Dissociative Experiences Questionnaire. In *Assessing psychological trauma and PTSD.* (pp. 412-428). The Guilford Press.

Marteau, T. M., & Bekker, H. (1992). The development of a six-item short-form of the state scale of the Spielberger State–Trait Anxiety Inventory (STAI). *British Journal of Clinical Psychology*, *31*(3), 301-306. https://doi.org/10.1111/j.2044-8260.1992.tb00997.x

Merckelbach, H., Dekkers, T., Wessel, I., & Roefs, A. (2003). Dissociative symptoms and amnesia in Dutch concentration camp survivors. *Comprehensive Psychiatry*, *44*(1), 65-69. https://doi.org/10.1053/comp.2003.50011

Michael, T., Ehlers, A., & Halligan, S. L. (2005). Enhanced priming for trauma-related material in posttraumatic stress disorder. *Emotion, 5*(1), 103. https://doi.org/https://doi.org/10.1037/1528-3542.5.1.103

Miller, P. P., Brown, T. A., DiNardo, P. A., & Barlow, D. H. (1994). The experimental induction of depersonalization and derealization in panic disorder and nonanxious subjects. *Behaviour Research and Therapy, 32*(5), 511-519. https://doi.org/doi: 10.1016/0005-7967(94)90138-4

Mott, F. W. (1919). *War neuroses and shell shock*. H. Frowde.

Murray, J., Ehlers, A., & Mayou, R. A. (2002, Apr). Dissociation and post-traumatic stress disorder: two prospective studies of road traffic accident survivors. *British Journal of Psychiatry, 180*, 363-368. https://doi.org/https://dx.doi.org/10.1192/bjp.180.4.363

Ozer, E. J., Best, S. R., Lipsey, T. L., & Weiss, D. S. (2003). Predictors of posttraumatic stress disorder and symptoms in adults: a meta-analysis. *Psychological Bulletin, 129*(1), 52. https://doi.org/doi:10.1037//0033-2909.129.1.52

Piolino, P., Belliard, S., Desgranges, B., Perron, M., & Eustache, F. (2003). Autobiographical Memory and Autonoetic Consciousness in a case of Semantic Dementia. *Cognitive Neuropsychology, 20*(7), 619-639. https://doi.org/10.1080/02643290242000899

Piolino, P., Desgranges, B., Benali, K., & Eustache, F. (2002). Episodic and semantic remote autobiographical memory in ageing. *Memory, 10*(4), 239-257. https://doi.org/10.1080/09658210143000353

Roediger, H. L., Weldon, M. S., Stadler, M. L., & Riegler, G. L. (1992). Direct comparison of two implicit memory tests: Word fragment and word stem completion. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 18*(6), 1251. https://doi.org/https://doi.org/10.1037/0278-7393.18.6.1251

Römisch, S., Leban, E., Habermas, T., & Döll-Hentschker, S. (2014). Evaluation, immersion, and fragmentation in emotion narratives from traumatized and nontraumatized women. *Psychological Trauma: Theory, Research, Practice, and Policy, 6*(5), 465. https://doi.org/doi:10.1037/a0035169

Rubin, D. C. (2011). The coherence of memories for trauma: Evidence from posttraumatic stress disorder. *Consciousness and Cognition, 20*(3), 857-865. https://doi.org/doi:10.1016/j.concog.2010.03.018

Rubin, D. C., Feldman, M. E., & Beckham, J. C. (2004). Reliving, emotions, and fragmentation in the autobiographical memories of veterans diagnosed with PTSD. *Applied Cognitive Psychology: The Official Journal of the Society for Applied Research in Memory and Cognition, 18*(1), 17-35. https://doi.org/doi:10.1002/acp.950

Sachschal, J., Woodward, E., Wichelmann, J. M., Haag, K., & Ehlers, A. (2019). Differential effects of poor recall and memory disjointedness on trauma symptoms. *Clinical Psychological Science, 7*(5), 1032-1041. https://doi.org/10.1177/2167702619847195

Sopp, M. R., Streb, M., Brueckner, A. H., Schäfer, S. K., Lass-Hennemann, J., Mecklinger, A., & Michael, T. (2020). Prospective associations between intelligence, working memory capacity, and intrusive memories of a traumatic film: Potential mediating effects of rumination and memory disorganization. *Journal of Behavior Therapy and Experimental Psychiatry, 70*, 101611. https://doi.org/https://doi.org/10.1016/j.jbtep.2020.101611

Sündermann, O., Hauschildt, M., & Ehlers, A. (2013). Perceptual processing during trauma, priming and the development of intrusive memories. *Journal of Behavior Therapy and Experimental Psychiatry, 44*(2), 213-220. https://doi.org/10.1016/j.jbtep.2012.10.001

Thoresen, S., Tambs, K., Hussain, A., Heir, T., Johansen, V. A., & Bisson, J. I. (2010). Brief measure of posttraumatic stress reactions: Impact of Event Scale-6. *Social psychiatry and psychiatric epidemiology, 45*(3), 405-412. https://doi.org/doi:10.1007/s00127-009-0073-x

Tulving, E. (1985). Memory and consciousness. *Canadian Psychology/Psychologie canadienne, 26*(1), 1-12. https://doi.org/10.1037/h0080017

Tulving, E. (2001). Origin of autonoesis in episodic memory. In H. L. Roediger, III, J. S. Nairne, I. Neath, & A. M. Surprenant (Eds.), *The nature of remembering: Essays in honor of Robert G. Crowder.* (pp. 17-34). American Psychological Association. https://doi.org/10.1037/10394-002

Tulving, E. (2002). Episodic memory: From mind to brain. *Annual review of psychology, 53*(1), 1-25. https://doi.org/https://doi.org/10.1146/annurev.psych.53.100901.135114

Tulving, E., Schacter, D. L., Mclachlan, D. R., & Moscovitch, M. (1988). Priming of semantic autobiographical knowledge: a case study of retrograde amnesia. *Brain and cognition, 8*(1), 3-20. https://doi.org/https://doi.org/10.1016/0278-2626(88)90035-8

Vaidya, C. J., Gabrieli, J. D., Keane, M. M., Monti, L. A., Gutierrez-Rivas, H., & Zarella, M. M. (1997). Evidence for multiple mechanisms of conceptual priming on implicit memory tests. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 23*(6), 1324. https://doi.org/https://doi.org/10.1037/0278-7393.23.6.1324

van der Hart, O., & Dorahy, M. J. (2009). History of the concept of dissociation. In *Dissociation and the dissociative disorders: DSM-V and beyond.* (pp. 3-26). Routledge/Taylor & Francis Group.

Waller, N., Putnam, F. W., & Carlson, E. B. (1996). Types of dissociation and dissociative types: A taxometric analysis of dissociative experiences. *Psychological methods, 1*(3), 300. https://doi.org/doi:10.1037/1082-989X.1.3.300

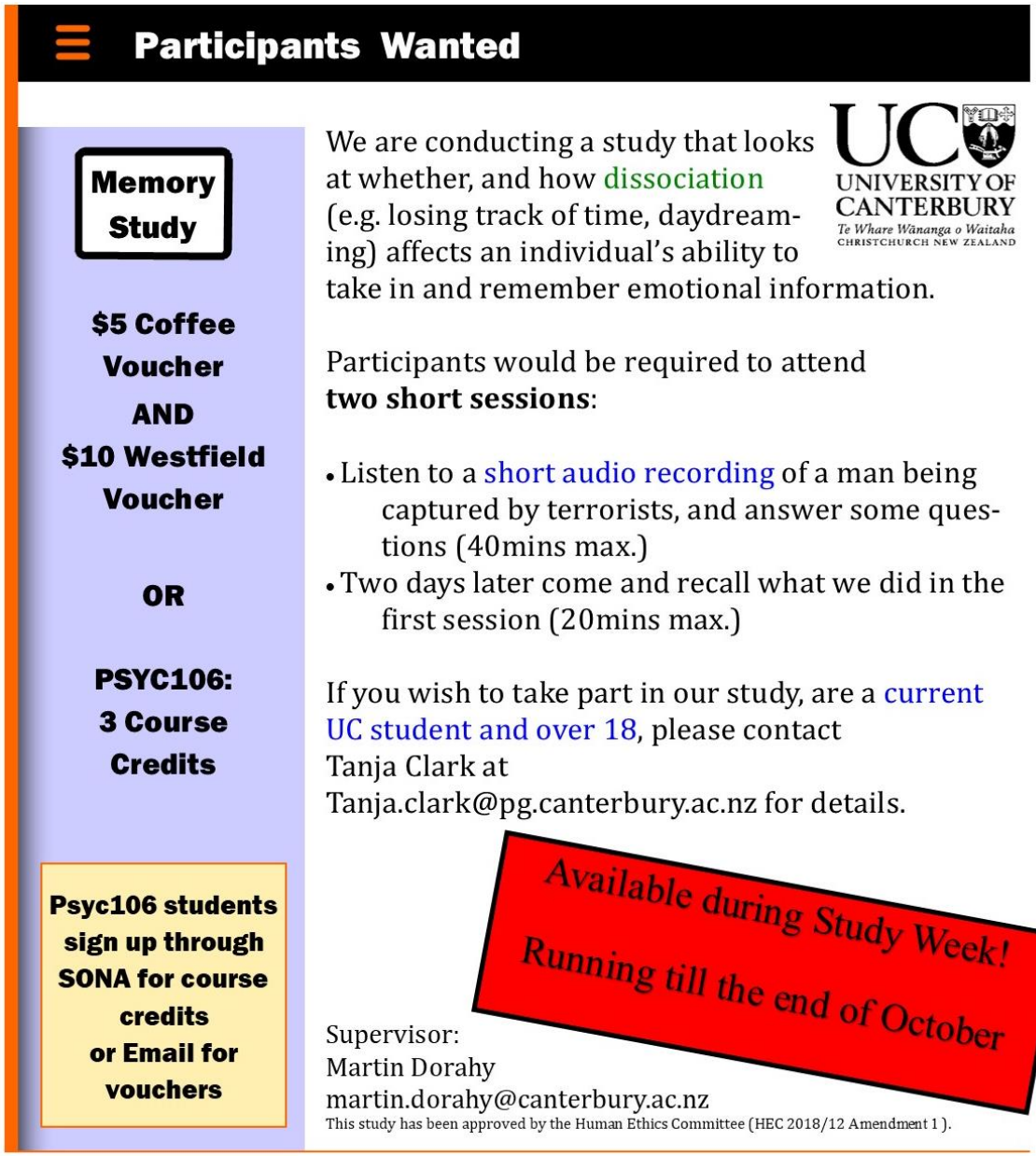
Wechsler, D. (2009). WMS-IV. *Wechsler memory scale-Administration and scoring manual: Psychological Corporation*.

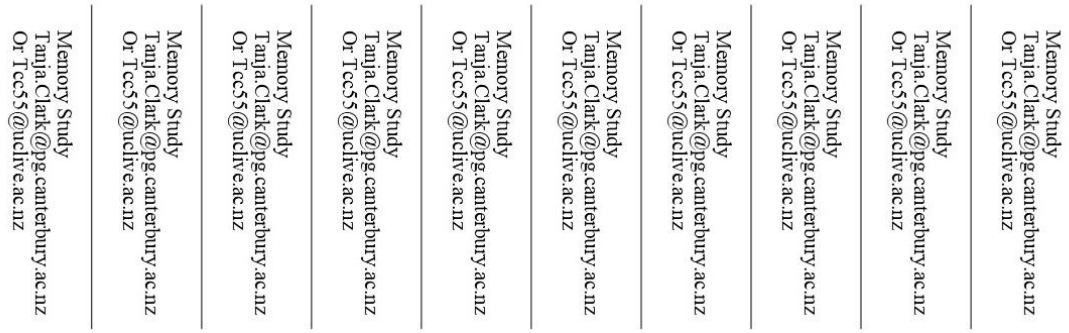
Weiss, D. S. (2004). The Impact of Event Scale-Revised. In J. P. Wilson & T. M. Keane (Eds.), *Assessing psychological trauma and PTSD., 2nd ed.* (pp. 168-189). The Guilford Press. http://ezproxy.canterbury.ac.nz/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=psyh&AN=2004-21033-007&site=ehost-live

Williams, H. L., Conway, M. A., & Cohen, G. (2008). Autobiographical memory. In *Memory in the real world, 3rd ed.* (pp. 21-90). Psychology Press. https://doi.org/https://doi.org/10.1016/b978-012370509-9.00135-2

Zoellner, L. A., Alvarez-Conrad, J., & Foa, E. B. (2002). Peritraumatic dissociative experiences, trauma narratives, and trauma pathology. *Journal of Traumatic Stress, 15*(1), 49-57. https://doi.org/10.1023/A:1014383228149

Appendix A
Advertising Poster





Appendix B
Trauma Narrative (TFP-A)

Capture

My name is Max Jones, and I am a freelance journalist filing reports from Syria. I was travelling with Jack Castle, a British photographer. Jack and I were only 40 minutes from the Turkish border when we stopped at an internet café to upload our stories and photographs. A tall man with eyes of pure evil and a big beard hiding most of his face came in. He went to a computer and sat for only a minute before leaving.

Once our task was complete, we packed up, and hailed a taxi for the drive to Turkey along with our local translator. As we were winding through the streets a van sped up behind our taxi and cut us off. Masked fighters streamed out of the van, brandishing weapons and screaming at us in Arabic to lie on the pavement. They handcuffed us and threw us unceremoniously in to the van.

Interrogation One

We were taken to an abandoned factory and placed in separate cells. Armed guards stripped us of our personal belongings, their faces, actions and eyes all promising pain if we did not comply immediately. They then demanded the passwords for all our electronic devices. I refused and was beaten. The explosions of agony were unlike those I'd ever experienced, and I lost consciousness.

I awoke, face down on the horrible, cold and sticky concrete floor. It wasn't until I sat up that I realised the stickiness was my own blood. They once again asked for my passwords, and I gave them immediately. As a consequence for my initial reluctance I was rewarded with a vicious kick to my ribs. The pain I felt whenever I breathed confirmed to me that I had broken ribs, leaving me

unable to take more than shallow breaths. They left me in my cell for hours without food or water, with nothing to distract me from the pain I felt. I was not, however, without hope. Surely someone would rescue us. Then my cell door was thrown open.

Interrogation Two

I screamed and tried to fight back as they dragged me out, my ribs and chest aching the whole time. I was heaved into a room and handcuffed to a rail above my head. All of my electronics were strewn across a table. They had checked my laptop, tablet and phone for information about me and my work. They thought I was a spy. I was stripped and suspended naked whilst they checked for a GPS chip hidden under my skin, or a microphone within my clothes.

They left me there and then came back with knives, chains and a steel poker that they heated red-hot over a fire. Each was used on me repeatedly as they took immense pleasure in dehumanizing me. I could feel each instrument penetrating, piercing and searing my skin. I screamed as they burned and whipped me. The wounds were instantly cauterized by the hot bar, so I did not bleed to death. There were no reasons for their actions other than punishment and their own amusement. No questions were asked, no information demanded.

Torture Two

We were eventually moved to a basement prison underneath a Hospital, where my torture continued. Sometimes cruel beatings would occur, and at other times a more heinous act would take place in a room we called “The Shower”. My first visit to that room was burned into my memory like the scars of torture were burned into my flesh. The room was pitch black beyond the pool of light in the centre, but you could hear the sound of water. I was forced to lie on a table in a reclining position, with a cloth sack over my head. I can still feel its rough texture scraping my face and restricting my breathing. Without any warning a torrent of ice-cold water was poured over my face and into my mouth. I couldn’t breathe. I couldn’t see. I was drowning on dry land, and my gaolers were laughing. They revelled in my pain.

The burn in my throat as I tried to breathe was driving me insane. Even when the water stopped I couldn’t breathe - the wet sack over my face was preventing that. This went on for hours. Or at least I was told it was hours. Time meant nothing in that room. You were marooned on an island of terror, with no air, no light, and no one to help you. When we saw hostages brought back to the cell we waited to see if they were covered in blood or water. Beatings at least reminded us that we were needed for information. Waterboarding was entertainment.

Ransom

After about 13 months of this horror we were told to hand over the email addresses of our nearest relatives so they could be sent ransom notes. I gave the address of my youngest brother. I could only gain some small relief knowing that at least my family would know that I was alive. I was beginning to feel hopeful. I might go home. It was then we realised that only certain prisoners were being routinely freed. Freedom came for those whose countries paid ransoms – my country did not. The realisation crushed me. It was then that I knew I was never getting out.

The End

I am scared to die. The cell door opens, and I am forced to wear an orange jumpsuit and a cloth bag over my head. My hands were bound with rope. For the first time in months I am led outside. I am shoved into a vehicle. After what seems like hours I am led out of the vehicle and the bag is taken off my head. I see desert. I see black clad figures. I see cameras. And I see a sharp blade, shimmering in the blazing light of the sun. I am led to a point in front of the camera and placed on my knees. One of the black clad figures steps up beside me and picks up the long, sharp blade. The Arabic word for action is yelled out, and the cameras are turned on. I do not listen to the ugly words of anger and self-righteousness that my executioner is spouting, I am done with this world. I wait, and wait until finally I feel the icy pain of the blade on my neck breaking the skin and I am gone.

Appendix C
Intrusion Diary

Date and Time of Original Session: _____
Date/Time of Next Session: _____

Intrusion Diary

Over the next 3 days please take time to fill out the following thought diary (starting as soon as you leave today).

We would ask you to put in any thoughts/memories/images about the scenario you heard at the lab, occurring when you had not intended to think about the scenario. These are called intrusive images and **occur spontaneously**, **not when you are intentionally thinking about the projec**t.

You are being asked to record the number of intrusions you have, when you have them, a brief description of the intrusion, the type of intrusion you have, the feelings that accompany the intrusion and how distressing it was to you using the ratings below.

Emotion Type:

1. Neutral
2. Interest
3. Joy
4. Sadness
5. Surprise
6. Anger
7. Disgust
8. Fear
9. Shame
10. Guilt
11. Amusement
12. Anxiety
13. Other: Please state.

At the end of the 3 days, before you come to the Lab, please fill out this next question:

To what extent did you feel you were able to record in the diary all your thoughts/memories/feelings about the story you heard on a scale of 0 (*Never remembered to write down the thoughts/memories/feelings)* to 10 (*Always remembered to write down the thoughts/memories/feelings)*

0 1 2 3 4 5 6 7 8 9 10

Distress Scale:

0- Totally relaxed, no emotion
1- Alert and awake, concentrating well, and inkling of feeling something
2- Minimal emotion
3- Mild emotion, no interference with performance
4- Somewhat upset to the point that you cannot easily ignore an unpleasant thought. You can handle it ok but don't feel good.
5- Moderate emotion, uncomfortable but can continue to perform
6- Feeling emotion to the point that you begin to think something ought to be done about the way you feel.
7- Quite emotional, interfering with performance
8- Very emotional, can't concentrate
9- Extremely emotional
10- Highest emotion you have ever felt.

Intrusion Type:
Audio (A): a line of dialogue or voice from the narrative intrudes into your thought process.
Visual (V): A picture or image.
Audio and Visual (AV): A combination of both an audio and visual intrusion.

You will receive an email prompt each morning to complete your intrusion diary. Please try and keep this on you at all times, and record whenever you have an intrusion. Please be as accurate as possible in your descriptions. If you need a new diary at any time, please feel free to contact the researcher at: michelle.downs-woolley@pg.canterbury.ac.nz

Example Diary Entry:

DAY ONE:

	Time	Description of Intrusion and Trigger	Type of Intrusion	Emotion	Distress
Morning	9am	Hearing my lecturer's voice saying "The test is worth 30% of your grade" in my thoughts when I started to study.	A	13 Stressed	4
	10am	Image of a failed exam paper burst into my mind when I was sitting down to a practice test.	V	12 Anxious	3

DAY ONE:

	Time	Description of Intrusion and Trigger	Type	Emotion	Distress
Morning					
Afternoon					
Evening					
Night					

DAY TWO:

	Time	Description of Intrusion and Trigger	Type	Emotion	Distress
Morning					
Afternoon					
Evening					
Night					

DAY THREE:

	Time	Description of Intrusion and Trigger	Type	Emotion	Distress
Morning					
Afternoon					
Evening					
Night					

Appendix D
DES
(Carlson & Putnam, 1993)

These questions describe experiences that you may have in your daily life. Your answer should show how often these experiences happen to you when you ARE NOT under the influence of alcohol or drugs. Please select a number from 0% to 100% to show what percentage of the time these experiences have happened to you.

(NEVER) 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% (ALWAYS)

1. Some people have the experience of driving or riding in a car or bus or subway and suddenly realising that they don't remember what has happened during all or part of the trip.

2. Some people find that sometimes they are listening to someone talk and they suddenly realise that they did not hear part or all of what was said.

3. Some people have the experience of finding themselves in a place and having no idea how they got there.

4. Some people have the experience of finding themselves dressed in clothes that they don't remember putting on.

5. Some people have the experience of finding new things among their belongings that they do not remember buying.

6. Some people sometimes find that they are approached by people that they do not know who call them by another name or insist that they have met them before.

7. Some people sometimes have the experience of feeling as though they are standing next to themselves or watching themselves do something and they actually see themselves as if they were looking at another person.

8. Some people are told that they sometimes do not recognise friends or family members.

   [Validity Item]. If you are reading this please select 100% (eleventh across)

9. Some people find that they have no memory for some important events in their lives (for example, a wedding or graduation).

10. Some people have the experience of being accused of lying when they do not think that they have lied.

11. Some people have the experience of looking in a mirror and not recognising themselves.

12. Some people have the experience of feeling that other people, objects and the world around them are not real.

13. Some people have the experience of feeling that their body does not seem to belong to them.

14. Some people have the experience of sometimes remembering a past event so vividly that they feel as if they were reliving that event.

15. Some people have the experience of not being sure whether things that they remember happening really did happen or whether they just dreamed them.

16. Some people have the experience of being in a familiar place but finding it strange and unfamiliar.

17. Some people find that when they are watching television or a movie they become so absorbed in the story that they are unaware of other events happening around them.

18. Some people find that they become so involved in a fantasy or daydream that it feels as though it were really happening to them.

19. Some people find that they sometimes are able to ignore pain.

20. Some people find that they sometimes sit staring off into space, thinking of nothing, and are not aware of the passage of time.

21. Some people sometimes find that when they are alone they talk out loud to themselves.

22. Some people find that in one situation they may act so differently compared with another situation that they feel almost as if they were two different people.

23. Some people sometimes find that in certain situations they are able to do things with amazing ease and spontaneity that would usually be difficult for them (for example, sports, work, social situations, etc.).

24. Some people sometimes find that they cannot remember whether they have done something or have just thought about doing this (for example, not knowing whether they have just mailed a letter or have just thought about mailing it).

25. Some people find evidence that they have done things that they do not remember doing.

26. Some people sometimes find writings, drawings, or notes among their belongings that they must have done but cannot remember doing.

27. Some people sometimes find that they hear voices inside their head that tell them to do things or comment on things that they are doing.

28. Some people sometimes feel as if they are looking at the world through a fog so that people and objects appear far away or unclear.

Appendix E
PDEQ
(Marmar et al., 1997)

Spinning Dot Condition:
Please complete the items below by selecting the choice that best describes your experiences and reactions *whilst you were watching the spinning dot*. If an item does not apply to your experience, please select "Not at all True".

Picture Condition:
Please complete the items below by selecting the choice that best describes your experiences and reactions *whilst you were watching the pictures*. If an item does not apply to your experience, please select "Not at all True".

Control Condition:
Please complete the items below by selecting the choice that best describes your experiences and reactions *whilst you were sitting quietly*. If an item does not apply to your experience, please select "Not at all True".

Not At All True	Not Very True	Somewhat True	Fairly True	Very Much True
0	1	2	3	4

1. I had moments of losing track of what was going on – I "blanked out" or felt separate from what was going on.
2. My sense of time changed – things seemed to be happening in slow motion.
3. What was happening seemed unreal to me, like I was in a dream or a fog.
4. I felt as though I were a spectator watching what was happening to me, as if I were floating above the scene or observing it as an outsider.
5. There were moments when my sense of my own body seemed distorted or changed. I felt disconnected from my own body, or that it was unusually large or small.
6. I felt as though things that were actually happening to others were happening to me – like I was being trapped when I really wasn't.
7. I felt confused; that is, there were moments when I had difficulty making sense of what was happening.
8. I felt disoriented; that is, there were moments when I felt uncertain about where I was or what time it was.
9. I have gaps in my memory and cannot remember parts of the experiment.
10. I felt emotionally numb; that is, there were moments whilst sitting quietly where I did not feel any emotions or felt emotionally empty.

Appendix F
IES-6
(Thoresen et al., 2010)

The following is a list of difficulties people sometimes have after stressful life events. Please read each item, and then indicate how distressing each difficulty has been for you during the past 3 days with respect to the audio clip we played at the last session.

How much were you distressed or bothered by these difficulties?

Not At All	A little bit	Moderately	Quite a bit	Extremely
1	2	3	4	5

1. I thought about it when I didn't mean to
2. I felt watched or on guard
3. Other things kept making me thing about it
4. I was aware that I still had a lot of feelings about it, but I didn't deal with them
5. I tried not to think about it
6. I had trouble concentrating

Appendix G
STAI
(Marteau & Bekker, 1992)

A number of statements which people have used to describe themselves are given below. Read each statement, then select the most appropriate statement to indicate how you feel *right now, in this moment, after listening to the narrative*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

Not At All	Somewhat.	Moderately	Very Much
1	2	3	4

1. I feel calm
2. I fell tense
3. I feel upset
4. I am relaxed
5. I am content
6. I am worried

Appendix H
DASS-21

Please read each statement and select a number (0, 1, 2 or 3) which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement.

Did not apply to me at all.	Applied to me to some degree, or some of the time.	Applied to me to a considerable degree, or a good part of the time	Applied to me very much, or most of the time.
0	1	2	3

1. I found it hard to wind down
2. I was aware of dryness of my mouth
3. I couldn't seem to experience any positive feeling at all
4. I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion)
5. I found it difficult to work up the initiative to do things
6. I tended to over-react to situations
7. I experienced trembling (e.g.in the hands)
8. I felt that I was using a lot of nervous energy
9. I was worried about situations in which I might panic and make a fool of myself
10. I felt that I had nothing to look forward to
11. I found myself getting agitated
12. I found it difficult to relax
13. I felt down-hearted and blue
14. I was intolerant of anything that kept me from getting on with what I was doing
15. I felt I was close to panic
16. I was unable to become enthusiastic about anything
17. I felt I wasn't worth much as a person
18. I felt that I was rather touchy
19. I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat)
20. I felt scared without any good reason
21. I felt that life was meaningless

Appendix I
Validity Questions
(Downs-Woolley, 2019)

Encoding:

- How much were you able to fully focus on or attend to the narrative?
- How anxious were you whilst listening to the narrative?
- How well do you remember the story?

Retrieval:

Pre-recall of Narrative

- How clear and organised do you feel your memory is of what you heard three days ago? How well do you remember the story?
- Since I listened to this story, I have thought about its content (i.e., rehearsed recalling the narrative).
- Since I listened to the story, I have talked about its contents to others.

Post-recall of Narrative

- Since I listened to the story, I have talked about its contents to others.
- How much did you understand the narrative?
- How disorganized and/or jumbled do you believe your recollection was?

Appendix J
Narrative Categories and Codes

Category	Code	Description	Example
Thoughts			
	Repetition	A large proportion of an utterance is repeated within five utterances	He was hung up by his hands | They asked him questions | and they hung him up
	Desperate	Utterances implying the individual lost the ability to cope with the situation	He thought he was going to die
	Disorganised	Expressed uncertainty for memory/an event, implying confusion or disjointed thinking	Where was he from? I am not sure. What happened next? Was that earlier?
	Organised	Implies realisations, decision making or planning	He did not give his passwords, "so he was beaten"
	Unfinished	Stops mid-thought and changes the topic	Then he…, after that….
Disorganisation			
	Disjointedness	The wording of an utterance does not make sense	He went then the tree and was awake.
	Confusion	Two options: 1. A participant has correct facts, yet in the place in the story; or 2. When querying the story content	1. he was asked for an email address and then water boarded 2. There was water, wasn't there?
Elaborations			
	Elaboration	When an individual has created some aspect or information about the story which was never mentioned	He was American
Omission			
	Omission	Recall of an utterance yet avoiding/omitting aspects of the story	"He woke up in blood" without mentioning that he was beaten unconscious
Sensations			
	Five senses	Based on sight, scent, hearing, taste and touch	He could taste the blood, he could hear water running
	Visceral (Felt)	Description of feeling	He felt the roughness of the sack on his head

Continued

Category	Code	Description	Example
Affect			
	Negative	References to negative affect, defined as unpleasant emotions such as humiliation, fear and shock	He was scared to die
	Positive	References to positive emotions/affect, defined as pleasant and positive references to emotion	He had hope that he would get to go home
Action			
	Character	Reference to actions performed by the main character	He lay down on the table
	Perpetrator	Actions performed by the perpetrators	They tortured him
	Other	Action performed by others.	The waiter looked around
Dialogue			
	Character	Reference to words/speech by main character. Does not have to be direct speech.	He told them the passwords
	Perpetrator	Reference to words/speech by perpetrator. Does not have to be direct speech.	They kept asking for passwords
	Other	Reference to words/speech by other characters. Does not have to be direct speech	Jack gave them the passwords
Misc./Facts			
	Correct	Correct recall which does not fit any other category	The reporters name was Jack
	Incorrect	Incorrect recall which does not fit any other category	They were in England
Speech Fillers		Expressions	Um, so, like, hm, ah

Appendix K
Narrative Details Sheet

#	Flow		Order	Sum
Capture				
	1	My name is Max		
	2	Jones,		
	3	and I am a freelance journalist		
	4	filing reports		
	5	from Syria.		
	6	I was travelling with Jack		
	7	Castle,		
	8	a British photographer.		
	9	Jack and I were only 40 minutes from the Turkish border		
	10	when we'd stopped at an internet café to upload our stories and photographs.		
	11	A tall man		
	12	with eyes of pure evil		
	13	and a big beard hiding most of his face		
	14	came in.		
	15	He went to a computer		
	16	and sat for only a minute		
	17	before leaving.		
	18	Once our task was complete, we packed up,		
	19	and hailed a taxi for the		
	20	drive to Turkey along with our		
	21	local translator.		
	22	As we were winding through the streets a van sped up behind our taxi		
	23	and cut us off.		
	24	Masked fighters streamed out of the van,		
	25	brandishing weapons		
	26	and screaming at us in Arabic		
	27	to lie on the pavement.		
	28	They handcuffed us		
	29	and threw us unceremoniously in to the van.		/29
Interrogation One				
	30	We were taken to an abandoned factory		
	31	and placed in separate cells.		
	32	Armed guards stripped us of our personal belongings,		
	33	their faces, actions and eyes all promising pain if we did not comply immediately.		

	34	They then demanded the passwords for all our electronic devices.		
	35	I refused		
	36	and was beaten.		
	37	The explosions of agony were unlike those I'd ever experienced,		
	38	and I lost consciousness.		
	39	I awoke,		
	40	face down on the horrible, cold and sticky concrete floor.		
	41	It wasn't until I sat up that I realised the stickiness was my own blood.		
	42	They once again asked for my passwords,		
	43	and I gave them immediately.		
	44	As a consequence for my initial reluctance I was rewarded with a vicious kick to my ribs.		
	45	The pain I felt whenever I breathed confirmed to me that I had broken ribs,		
	46	leaving me unable to take more than shallow breaths.		
	47	They left me in my cell for hours		
	48	without food or water,		
	49	with nothing to distract me from the pain I felt.		
	50	I was not however without hope.		
	51	Surely somebody would rescue us.		
	52	Then my cell door was thrown open.		/23
Interrogation Two				
	53	I screamed		
	54	and tried to fight back		
	55	as they dragged me out,		
	56	my ribs and chest aching the whole time.		
	57	I was heaved into a room		
	58	and handcuffed to a rail above my head.		
	59	All of my electronics were strewn across a table.		
	60	They had checked my laptop, tablet and phone		
	61	for information about me and my work.		
	62	They thought I was a spy.		
	63	I was stripped and suspended naked		
	64	whilst they checked for a GPS chip hidden under my skin,		
	65	or a microphone within my clothes.		
	66	They left me there		
	67	and then came back with knifes, chains and a steel poker		
	68	that they heated red-hot over a fire		/25

	69	Each was used on me repeatedly		
	70	as they took immense pleasure in dehumanising me.		
	71	I could feel each instrument penetrating, piercing and searing my skin.		
	72	I screamed as they burned and whipped me.		
	73	The wounds instantly cauterized by the hot bar,		
	74	so I did not bleed to death –		
	75	There was no reason for their actions other than punishment		
	76	and their own amusement.		
	77	No questions were asked, no information demanded.		
Torture Two				
	78	We were eventually moved to a basement prison		
	79	underneath a Hospital		
	80	Where my torture continued.		
	81	Some times the cruel beatings would occur,		
	82	and at other times a more heinous act would take place (Waterboarding)		
	83	in a room we call “The Shower”.		
	84	My first visit to that room burned into my memory like the scars of torture burned into my flesh.		
	85	The room was pitch black beyond the pool of light in the centre.		
	86	But you could hear the sound of water.		
	87	I was forced to lie on a table in a reclining position,		
	88	with a cloth sack over my head.		
	89	I can still feel it’s rough texture scraping my face		
	90	and restricting my breathing.		
	91	Without any warning a torrent of ice-cold water was poured over my face and into my mouth		
	92	I couldn’t breathe.		
	93	I couldn’t see.		
	94	I was drowning on dry land,		
	95	and my gaolers were laughing.		
	96	They revelled in my pain.		
	97	The burn in my throat as I tried to breathe was driving me insane.		
	98	Even when the water stopped I couldn’t breathe –		
	99	the wet sack over my face was preventing that.		
	100	This went on for hours.		
	101	Or at least I was told it was hours.		
	102	Time meant nothing in that room.		
	103	You were in absolute misery.		
	104	Marooned on an island of terror.		/32

	105	with no air, no light, and no one to help you.		
	106	When we saw hostages brought back to the cell we waited to see if they were		
	107	covered in blood or water.		
	108	Beatings at least reminded you that you were needed for information.		
	109	Waterboarding was entertainment.		
Ransom				
	110	After about 13 months of this horror		
	111	we were told to hand over the email addresses of our nearest relatives		
	112	so they could be sent ransom notes.		
	113	I gave the address of my youngest brother.		
	114	I could only gain some small relief knowing that at least my family would know I was alive.		
	115	I was beginning to feel hopeful.		
	116	I might go home.		
	117	It was then we realised that only certain prisoners were being routinely freed.		
	118	Freedom came for those whose countries paid ransoms –		
	119	my country did not.		
	120	The realisation crushed me.		
	121	It was then that I knew I was never getting out.		/12
The End				
	122	I am scared to die.		
	123	The cell door opens,		
	124	and I am forced to wear an orange jumpsuit		
	125	and a cloth bag over my head,		
	126	My hands were bound with rope.		
	127	For the first time in months I am led out side.		
	128	I am shoved into a vehicle,		
	129	After what seems like hours I am lead out of the vehicle		
	130	and the bag is taken off of my head.		
	131	I see desert.		
	132	I see black clad figures.		
	133	I see cameras.		
	134	And I see a sharp blade,		
	135	shimmering in the blazing light of the sun.		
	136	I am lead to a point in front of the camera		
	137	and placed on my knees.		
	138	One of the black clad figures steps up beside me		
	139	and picks up the long, sharp blade.		
	140	The Arabic word for action is yelled out,		/25

	141	and the cameras are turned on.		
	142	I do not listen to the ugly words of anger and self-righteousness that my executioner is spouting.		
	143	I am done with this world.		
	144	I wait, and wait		
	145	until finally I feel the icy pain of the blade on my neck breaking the skin		
	146	and I am gone.		

Total: /146

Appendix L
Word-Cue Association Task Stimuli

Cue Word	Total Frequency	Frequency per Million	Association to Target	Target	Word Total Frequency	Frequency per Million
Word Association Target Neutral Words						
Sand	21,112	36.56	3	Desert	21,312	36.90
Patient	45,040	77.99	7	Hospital	66,553	115.24
Enjoyment	3,485	6.03	5	Amusement	3,785	6.55
Newspaper	31,283	54.17	3	Journalism	8,556	14.82
Boundary	4,965	8.60	3	Border	32,470	56.23
Average	*21,177*	*36.67*	*4.2*		*132,676*	*45.95*
Word Association Target Threat Words						
Torment	1,216	2.11	3	Torture	7,689	13.31
Hurt	43,203	74.81	6	Painful	13,431	23.26
Bad	123,592	214.01	5	Evil	19,968	34.58
Nasty	7,397	12.81	5	Horrible	11,557	20.01
Freezing	5,337	9.24	3	Cold	70,610	122.27
Average	36,149	62.60	4.4		24,651	42.69
Word Association Non-Target Threat Words						
Slaughter	3,931	6.81	5	Killing	27,705	47.97
Blast	8,591	14.88	3	Bomb	18,711	32.40
Dislike	2,938	5.09	6	Hate	26,194	45.36
Thief	4,015	6.95	5	Steal	8,438	14.61
Horns	3,740	6.48	4	Devil	9,130	15.81
Average	4,643	8.04	4.6		18,036	31.23

The frequency per million was by taking the total frequency (1990-2017) divide it by 577,500,000 (number of words total in Corpus), then multiplied by 1,000,000 – thus creating a score per million for the whole corpus.

Appendix M
Word-Stem Association Task Stimuli

Target	Total Frequency	Frequency per Million	Stem	Match Word	Word Total Frequency	Frequency per Million
Target Threat Stimuli						
Misery	4,406	7.63	Mis	Mister	4,941	8.56
Whip	4,598	7.96	Whi	Whistle	4,167	7.22
Scream	6,498	11.25	Scr	Scratch	6,020	10.42
Strip	5,399	9.35	Str	Straw	6,936	12.01
Weapon	16,114	27.90	Wea	Wealth	18,345	31.77
Average	*7,403*	*12.82*			*8,082*	*13.99*
Non-Target Threat Stimuli						
Bullet	9,217	15.96	Bul	Bull	10,137	17.55
Poison	5,824	10.08	Poi	Poised	4,889	8.47
Harsh	8,092	14.01	Har	Harvest	9,075	15.71
Beast	7,165	12.41	Bea	Bean	7,086	12.27
Pandemic	1,829	3.17	Pan	Panther	1,521	2.63
Average	*6,425*	*11.13*			*6,542*	*11.33*
Target Neutral Stimuli						
Café	8,661	15.00	Ca	Castle	8,973	15.54
Rope	9,570	16.57	Ro	Romance	8,806	15.25
Taxi	5,774	10.00	Ta	Taboo	5,650	9.78
Tablet	2,638	4.57	Tab	Tabloid	2,072	3.59
Microphone	4,316	7.47	Mic	Microwave	4,175	7.23
Average	*6,192*	*10.72*			*5,935*	*10.28*

Appendix N
Information Sheet

College of Science
Department of Psychology
Telephone: +64 3 369 4337
Email: tanja.clark@pg.canterbury.ac.nz
21/05/2019
HEC Ref: HEC 2018/12

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Information Sheet for participants

The Role of Dissociation and Memory in Analogue Distressing Narratives

My name is Tanja Clark and I am a Masters student in the Department of Psychology, and the principal researcher for this project. You are invited to take part in this research project entitled "The Role of Dissociation and Memory in Analogue Distressing Narratives".

This study aims to look at the effect that dissociation has on how people take in and remember information. Dissociation is the unintentional disruption in the normal integration of your experience into memory, where you lose track of what is going on around you by mentally switching off (i.e., daydreaming, working on auto-pilot). The study is split into two sessions:

1. Where participants receive information by listening to a story via an audio recording
2. Where we ask participants to recall the story

These two sessions will be three days apart, and you will be required to attend both sessions to complete the study. The narrative that you will listen to depicts a journalist who was kidnapped by a terrorist group, tortured and ultimately killed. This narrative is based on a true story, and was compiled using first-hand accounts of those who were in captivity with the journalist and survived.

In the first session you are given a number of questionnaires about your experiences during the study. You will listen to the story while either watching a spinning dot or pictures on a computer screen, or not looking at the screen. We will also get you to complete two word tasks. One will give you the start of a word, and you are asked to finish it (word stem task), the other gives you a word and you respond with a word associated with the one shown (word association task). At the end of session 1, you are given a diary to record the amount of times you think about the story between sessions.

The second session will take place three days later, where you will be asked to hand in your diary. You will then be asked to recall the story in as much detail as you can, whilst completing another visual task. These recollections will be recorded. Short questionnaires will follow, regarding their experience.

Below is a schedule, and time estimates for each part of the experiment.

Measure Assessment	**Approximate time taken**
Session One (ca 45 minutes)	
Consent	5 minutes
Baseline measures	3 minutes
Questionnaires	15 minutes
Listen to Narrative	8 minutes
Questionnaires	2 minutes
Word Task	10 minutes
Thought Diary	A few minutes over the course of three days
Session Two (ca 20 min)	
Recalling Narratives	10 minutes
Questionnaires	5 minutes

In the performance of the tasks and application of the procedures there are risks of participants becoming distressed due to the content of the story. The narrative in the story is taken from true events and does depict potentially distressing events, such as torture and death. A list of supportive services is provided at the end of this document should you wish to talk to anyone about any distress that lingers after the study. You are also free to contact the researcher or her supervisor (Martin Dorahy, clinical psychologist) about your experience. Due to the visual material used in some of the conditions, it is necessary for the researcher to know if you have photo-sensitivity migraines or epilepsy. Please indicate to the researcher on the consent form if this applies to you. This will not exclude you from the study.

Participation is voluntary and you have the right to withdraw at any stage without penalty. You may ask for your raw data to be returned to you or destroyed at any point. If you withdraw, I will remove information relating to you. However, once analysis of raw data starts in November 2019, it will become increasingly difficult to remove the influence of your data on the results as all results will be anonymous. If you are recruited via PSYC106 Participant Pool you will receive 3 credits; whereas students recruited outside of the pool will receive a $5 coffee voucher after the first session and a $10 Westfield voucher at the conclusion of the second session.

The results of the project may be published, but you may be assured of the complete confidentiality of data gathered in this investigation: your identity will not be made public without your prior consent. To ensure confidentiality no names will be used on the assessments or in the final report, nor will there be a record (once data has been added to the computer) of any identifying information. Any and all information that has identifying features (such as the consent form), will be kept by Tanja in their locked office, where the diaries will also be stored. The diaries will not have any personal identification, bar participant code (i.e., Participant 1). Only the research team (Tanja Clark, Michelle Downs-Woolley and Martin Dorahy) will have access to the data, which will be stored securely and electronically by password protection. After the conclusion of the experiment Martin Dorahy will keep a copy of the raw data for 10 years, after which it will be destroyed (this includes Intrusion Diaries). A thesis is a public document and will be available through the UC Library.

The project is being carried out as a requirement for a Master's Thesis by Tanja Clark under the supervision of Martin Dorahy, who can be contacted at martin.dorahy@canterbury.ac.nz. We are happy to address any concerns you have about participation in the project. If you agree to participate in the study, you are asked to complete a consent form. Please indicate to the researcher on the consent form if you would like to receive a copy of the summary of results of the project.

This project has been reviewed and approved by the University of Canterbury Human Ethics Committee, and participants should address any complaints to The Chair, Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz).

Tanja Clark
tanja.clark@pg.canterbury.ac.nz

Martin Dorahy
martin.dorahy@canterbury.ac.nz

Appendix O
Ethics

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

HUMAN ETHICS COMMITTEE

Secretary, Rebecca Robinson
Telephone: +64 03 369 4588, Extn 94588
Email: human-ethics@canterbury.ac.nz

Ref: HEC 2018/12 Amendment 1

10 June 2019

Michelle Jane Downs-Woolley
Psychology
UNIVERSITY OF CANTERBURY

Dear Michelle

Thank you for your request for an amendment to your research proposal "The Role of Dissociation and Memory in Analogue Distressing Narratives" as outlined in your emails dated 22nd May and 6th June 2019.

I am pleased to advise that this request has been considered and approved by the Human Ethics Committee.

Yours sincerely

Dr Dean Sutherland
Chair, Human Ethics Committee

Note. Michelle Downs-Wooley is the author of the original research which this is an extension of, therefore her name appears on the ethics letter.

Appendix P
Consent Form

College of Science
Department of Psychology
Telephone: +64 3 369 4337
Email: tanja.clark@pg.canterbury.ac.nz

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Consent Form for Participants

The Role of Dissociation and Memory in Analogue Distressing Narratives

Name of researchers: Martin Dorahy (Clinical Psychologist/Professor, University of Canterbury)
Tanja Clark (Masters Student, University of Canterbury)
Michelle Downs-Woolley (Clinical Psychologist, University of Canterbury)

Expected date of completion of study: March 2020

- ☐ I have been given a full explanation of this project and have had the opportunity to ask questions.
- ☐ I understand what is required of me if I agree to take part in the research.
- ☐ I understand that participation is voluntary and I may withdraw at any time without penalty. Withdrawal of participation will also include the withdrawal of any information I have provided should this remain practically achievable.
- ☐ I understand that any information or opinions I provide will be kept confidential to the researcher and that any published or reported results will not identify the participants. I understand that a thesis is a public document and will be available through the UC Library.
- ☐ I understand that all data collected for the study will be kept in locked and secure facilities and/or in password protected electronic form and will be destroyed after ten years.
- ☐ I understand the risks associated with taking part and how they will be managed.
- ☐ I understand that I can contact the researcher Tanja Clark (tanja.clark@pg.canterbury.ac.nz) or supervisor Martin Dorahy (martin.dorahy@canterbury.ac.nz) for further information. If I have any complaints, I can contact the Chair of the University of Canterbury Human Ethics Committee, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz)
- ☐ I understand that my recollections will be audio recorded.
- ☐ I would like a summary of the results of the project (optional).
- ☐ I have had photo-sensitivity migraines/epilepsy in the past (this does not mean exclusion).
- ☐ My mobile phone is turned off/silent with alarms disabled.
- ☐ By signing below, I agree to participate in this research project.

Name:_____ Signed:_____ Date:_____

Email address:_____

Appendix Q
Debrief Form

College of Science
Department of Psychology
Telephone: +64 3 369 4337
Email: tanja.clark@pg.canterbury.ac.nz
HEC Ref: HEC 2018/12

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Debriefing form

The Role of Dissociation and Memory in Analogue Distressing Narratives

This study was interested in the effect that dissociation whilst listening to, and recalling emotional information, has on memory. Dissociation is the unintentional disruption in the normal integration of your experience into memory, where you lose track of what is going on around you by mentally switching off (i.e., daydreaming, working on auto-pilot, zoning out). It includes times where events are happening in front of you, but your brain is not paying attention. To help us examine this we gathered information using the Dissociative Experiences Scale - II (DES-II) (propensity to dissociate), the Modified Peritraumatic Dissociation Experiences Questionnaire (M-PDEQ) (current dissociation), the State-Trait Anxiety Inventory-6 (STAI-6), and the Depression, Anxiety and Stress Scale (DASS). We also asked participants to complete the revised Impact of Events Scale - 6 (IES-6) to control for any post-traumatic stress symptoms experienced.

To investigate this further, we asked participants to listen to a story, and then in the next session recall it, to assess not only what they remembered but how they remembered it. To do this we divided participants randomly into five groups. We then used the audio version of the Trauma Film Paradigm (TFP-A) where participants listened to a narrative of a journalist who was captured by a terrorist group. Variations on the TFP have been used to study memory and trauma for a long time (Holmes & Bourne, 2008). Details of this story were taken from interviews with other hostages who were in captivity but survived. This narrative is told from the first person point of view to capture the experience. The names in the narrative were changed to protect their identities and as a mark of respect. An article by the New York Times was used as the main source of information.

Visual tasks were used to control participants' ability to dissociate. Some of the participants watched a spiral to induce dissociation, others watched neutral pictures on the screen as a non-dissociation condition. The control group listened to the story as usual, that is, without having a visual focus. We also needed to check whether these tasks had an influence on dissociation or anxiety levels, so these tasks were also given without audio before the story was heard. To keep the stimuli novel however, participants only completed the baseline measures, which they *were not* going to receive whilst listening to the narrative.

We are also interested in how memories are recalled; therefore, participants returned to the lab three days later and were asked to recount as much information about the story as possible. We were again interested in how dissociation affected memory; therefore, participants were again divided into groups. Random group assignment for retrieval groups occurred where participants were in either the spiral or the pictures group, or were put in the listen as usual group. This latter group acted as a control.

We also sought information that indicates whether specific emotional words from the narrative (target words, such as, Hostage) were more easily remembered than either neutral or emotional words (Non-target words, such as Defy), which did not feature in the story – this is called perceptual priming. To test this, we conducted a Word-Stem Task (WST), where participants were required to complete word lists. We want to see whether participants will recall words which were in the narrative, over other possible words that fit the same beginning, i.e., Mis_____, could be Mis*ery* or Mis*ter*, where the word Misery featured in the story. We also had participants complete a Word-Association Task (WAT) where they were given a word, and then asked to say the first word that comes into their head, which if priming is operating, will be in the narrative (i.e., Sand → Desert, where the word Desert featured in the story).

If you feel the need to talk to anyone about the effect this study has had on you, a list of support services has been attached at the end of this debriefing form. If you want further information about the study, you can contact the researchers. Our contact details are below.

Tanja Clark
Email: tanja.clark@pg.canterbury.ac.nz

Martin Dorahy
Email: martin.dorahy@canterbury.ac.nz

Support Services

Samaritans: 0800 726 666

Lifeline: 0800 543 354

Health Line: 0800 611 116

Purapura Whetu Trust: (03) 379 8001

Counselling services

University of Canterbury Counselling service: (03) 364 2402

Petersgate Counselling Service: (03) 343 3391

Emergency services

Crisis Resolution/Psychiatric Emergency Service: (03) 364 0482 or 0800 920 092

Appendix R
Correlations for Gender following Hypothesis One

Pearson Correlations for Gender and Dependent Variables (2-tailed)

Hypothesis	Variable	Gender
Hypothesis two	Frequency day 1	-.039
(Intrusion Diary)	Frequency day 2	.116
	Frequency day 3	.146
	Distress Day 1	.288**
	Distress Day 2	.196*
	Distress Day 3	.102
Hypothesis three	Fragmentation	.113
(Narrative Categories)	Disorganisation	.054
	Organisation	.000
	Elaboration	.098
	Omission	.007
	Internal Events	.114
	External Events	-.212**
Hypothesis four	Details	-.068
(Narrative)	Coherence	.092
	Percept/Concept	.085
Hypothesis five	WST TT	-.073
(Priming)	WST TN	.096
	WST NTT	.003
	WAT TT	-.149
	WAT TN	.043
	WAT TN	-.006

** Correlation is significant at the .01 level; * Correlation is significant at the .05 level.

Appendix S
ANCOVA and ANOVA Comparisons

One-Way Analyses of Variance (ANOVA) Results, as well as Analyses of Covariance (ANCOVA) for the Dependent Variables with IES-6, DES, Focus, Anxiousness, Understanding, Fragmentation, and Talking as Covariates

	ANOVA					ANCOVA				
	F	*df*		*p*	η_p^2	*F*	*df*		*p*	η_p^2
		Var	*Error*				*Var*	*Error*		
Fragmentation	0.32	3	152	.812	.006	0.49	3	143	.688	.010
Disorganisation	1.10	3	152	.351	.021	0.65	3	143	.584	.013
Organisation	0.83	3	152	.480	.016	0.86	3	143	.462	.018
Elaboration	1.41	3	152	.243	.027	2.05	3	143	.110	.041
Omission	0.56	3	152	.645	.011	0.57	3	143	.639	.012
Internal Events	0.43	3	152	.734	.008	0.11	3	143	.957	.002
External Events*	1.64	3	152	.182	.031	0.78	3	142	.509	.016
Death Omission	1.65	3	152	.181	.031	1.51	3	143	.215	.031
Details	0.67	3	152	.570	.013	1.98	3	143	.119	.040
Percept/Concept	0.85	3	152	.468	.017	0.38	3	143	.765	.008

Note. Var = Variable.
* Gender was added as covariate due to significant Pearson Correlation.

Mixed Design Analyses of Variance (ANOVA) Results, as well as Analyses of Covariance (ANCOVA) for the Dependent Variables with IES-6, DES, Focus, Anxiousness, Understanding, Fragmentation, and Talking as Covariates

		ANOVA					ANCOVA				
		F	*df*		*p*	η_p^2	*F*	*df*		*p*	η_p^2
			Var	*Error*				*Var*	*Error*		
Distress*	Time	2.77	1.84	99.12	.072	.049	1.27	1.81	79.70	.284	.028
	Dis	0.91	1	54	.346	.016	0.51	1	44	.481	.011
	Inter	0.76	1.84	99.12	.459	.014	0.81	1.81	79.70	.372	.018
WST	Type	134.34	1.98	304.14	.000[a]	.466	1.88	1.97	285.88	.155	.013
	Dis	0.01	1	154	.947	.000	0.30	1	145	.585	.002
	Inter	0.67	1.98	304.14	.510	.004	1.57	1.97	285.88	.213	.011
WAT	Type	83.32	1.98	304.14	.000[a]	.351	2.55	1.97	285.56	.081	.017
	Dis	0.35	1	154	.555	.002	0.05	1	145	.821	.000
	Inter	0.84	1.98	304.14	.434	.005	1.11	1.97	285.56	.293	.008

Note. WST = Word Stem Completion Task; WAT = Word-cue Association Task; Dis = Dissociation; Inter = Interaction; Var = Variable.
*Gender was added as covariate due to significant Pearson Correlation.
[a]Significant difference between ANCOVA and ANOVA but not relevant to the hypotheses of the thesis